

February 2018

Reducing Single-Use Plastic in a Thai School Community: A Sociocultural Investigation in Bangkok, Thailand

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Reducing Single-Use Plastic in a Thai School Community

A Sociocultural Investigation in Bangkok, Thailand

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Above image taken by Paula Sardi at Thai Plastic Recycle

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BSAC



Sponsored by
The St. Joseph's Alumnae Association



Submitted by
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Submitted to
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Submitted on March 2nd, 2018

An Interactive Qualifying Project (IQP) submitted to the Faculty of Worcester Polytechnic Institute and an Interactive Social Science Project (ISSP) submitted to the Faculty of Science at Chulalongkorn University in partial fulfillment of the requirements for the Degree of Bachelor of Science by Keely Heyer, Wacharakul Laoasoke, Kelly Martin, Emily Molstad, Paula Sardi, Araya Bunnag and Artinan Wattanaburanon.

This report represents the work of four Worcester Polytechnic Institute undergraduate students and three Chulalongkorn University students submitted to the faculty as evidence of completion of a degree requirement. Worcester Polytechnic Institute routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at Worcester Polytechnic Institute, please see:
<http://www.wpi.edu/Academics/Projects>.

Abstract

Bangkok residents consume over 600,000 plastic items a day resulting in consequences affecting Thailand's economy, human health, and environment. Partnered with the St. Joseph's Alumnae Association (SJAA), our project sought to gain an understanding of plastic use and develop methods to reduce plastic consumption in the St. Joseph Convent School (SJC) and its community. We accomplished this by surveying stakeholders and interviewing plastic reduction programs. Our project investigated the reasons for plastic consumption, system limitations that prevent reducing plastic use, and the strengths and weaknesses of programs. We recommended a long-term action plan to SJAA that included sustainability curriculum, alternative materials, a plastic ban, and methods for continued success.

Executive Summary

The Problem

Plastic items are responsible for 60%-80% of all ocean trash and a large decline in oceanic ecosystems as seen in Figure 1 (Gall & Thompson, 2015). In the Asian Pacific region, Thailand is the leader in annual consumption of plastic per capita at 40 kg (Corben, 2017). In Thailand, 35% of total waste is disposed of via recycling, incineration or collection in a landfill, the remaining 65% ends up in open-dumping sites (Kaosol, 2009; Winn, 2016). Bangkok alone produces 1,800 metric tons of single-use plastics each day (Corporal, 2010; Gheewala, 2011). There has yet to be a significant impact on reducing plastic use in Thailand.



Figure 1: Oceanic Debris (Sea turtle plastic trash, 2017)

Our Goal

The goal of this project was to gain a deeper understanding of plastic use in Thailand and to develop successful methods to reduce plastic waste and consumption. Through our partnership with the St. Joseph's Alumnae Association (SJAA) we focused our project on the St. Joseph Convent School (SJC) in Bangkok, Thailand and their surrounding community.

Our Plan

Our first objective was to evaluate the successes and failures of plastic reduction programs. We conducted interviews with seven programs in Thailand. We interviewed Chula Zero Waste, Plastic Free NIST, Roong Aroon Zero Waste, ReReef, Trash Hero, Can Do Team, and Thai Plastic Recycle. We compared the strengths, weaknesses, opportunities, and threats program directors faced while implementing and continuing their programs.

Our second objective was to identify the factors that affect plastic consumption in a Thai school and its surrounding community. We visited SJC to observe and conduct surveys on students and parents to learn about individual behavior behind plastic consumption. Furthermore, we interviewed SJC's staff and vendors around the school to understand the systemic behaviors including social systems, disposal systems, and authoritarian systems that could influence plastic consumption or waste.

Our third objective was to create a long-term action plan for implementation in SJC and its community. Information gathered from project successes and failures reflect what is effective in Thai society and was the basis of our action-plan. Having flexible and clear guidelines will enable SJAA to develop programs and events that can promote and establish good habits regarding plastic usage.

Findings and Recommendations

From our observations, surveys and interviews we identified 7 key findings. Our first set of findings were discovered from program director interviews and analyzing the successes and failures of their organizations. We found:

1. Individual behavior change is difficult and inefficient

During interviews, directors stressed the difficulty of changing individual behavior in comparison to systematic behavior. Thai's act upon convenience making it more beneficial to change the system instead of the system changing with the individual.

2. Notable plastic reduction strategies

There is a variety of strategies that can address the plastic consumption problem such as: plastic taxing, incentives, introduction of reusable materials, and educating youth. These are notable strategies for systematic change to reduce plastic

from scenarios. Based on our research in our background and first objective we determined that strategies work more effectively within certain target audience sizes. The breakdown of these strategies with their respective target audience sizes can be seen in *Figure 2*.

3. Partnerships and effective marketing techniques strengthen programs

Interviewed programs affirmed multiple stakeholders working together allows community involvement and systematic changes. One of the most highlighted factors for programs to be successful was having partnerships as they guarantee participation and support of the community. Beside partnerships, marketing methods to promote a program will spread awareness amongst the community and increase the participation of individuals.

Our second set of findings focused on our data collection done in SJC and its community as outlined in our second objective. We found:

4. There are systems in place at SJC to reduce plastic waste and consumption

After conducting observations at SJC we found 27 water filters and many waste separation systems. We strived to find if students used the systems in place in SJC. We concluded plastic waste consumption isn't due to the lack of a waste management system.

5. Students are aware of the consequences associated with plastic

Our next question was if students are aware of the human and environmental impacts from plastic. Through our student surveys and teacher interviews, it was found that 49% of students "strongly agreed" that "plastic waste is harmful for the environment". No students disagreed that plastic was not harmful to the environment. However, plastic consumption persists, even with the awareness of plastic impacts.

6. Vendors use plastic products, but are willing to change their habits

From observations of SJC, we found the outside community obtains an excess of plastic from vendors. However, through interviews with vendors, we found that vendors are willing to use an alternative material if it aligns with their preferences. Additionally, SJC had an impact on vendors in the past such as their ban on foam. When the school campus limited the use of foam products outside vendors aligned with these regulations.

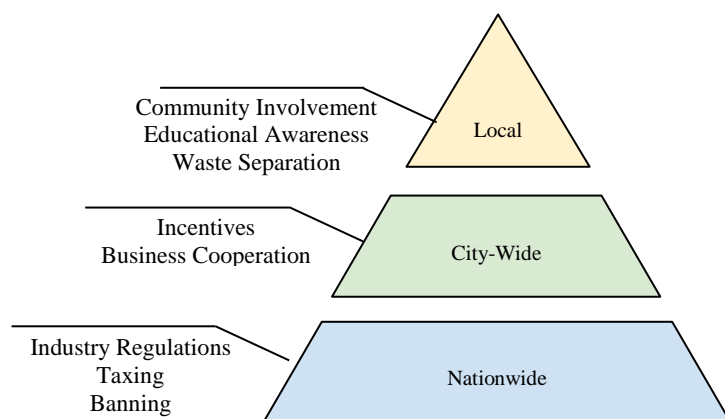


Figure 2: Breakdown of strategies and respective ideal target audience size

7. Focusing reduction on certain areas and items, along with community support, is important to make a change at SJC

To make a change in SJC we gathered data from influential stakeholders of the school. This included alumnae, parents, students, and teachers. We condensed our search to determine what areas of the school use the most plastic. Alumnae and faculty claimed the canteen was the area where the most plastic is used. Due to the school's close community, it was valuable to find if parents would be willing to participate in SJC's plastic program. Ninety nine percent of families answered they would support a plastic program introduced to the school. Gaining community support and focusing our project on specific areas would benefit SJC in reducing plastic.

In response to these findings, we have formulated 8 recommendations for SJAA to implement into SJC and its community. Our recommendations are broken up into three phases, the first of which focuses within SJC. From *Finding 5*, we found that students know about plastic reduction systems within their school, but don't always follow them. Although we collected empirical data about plastic usage in the school, we could not gain baseline data of how much plastic students consume regularly. To ensure success in SJC, we recommend the first step be to collect baseline data. Our next step is based on *Finding 2*, stating education of plastic impacts is valuable. *Finding 5* contradicts this since students are seemingly already aware, yet still use plastic. While these findings are conflicting, we suggest to educate individuals and promote awareness regarding plastic consumption at a young age to impact their behavior regarding the impacts of single-use plastics. We further believe that a project should be created to address educational awareness and the gap between learning and taking action. After creating a program, we recommend the reinforcement of alternative materials in the school to promote less plastic consumption. This option can potentially reach the external community as supported by *Finding 6*. *Finding 7* supports taking our reduction plan one step further as we suggest an official ban or limitation on plastic inside SJC. This recommendation would be the final stage of reducing plastic within the internal community of SJC.

The second phase of our recommendations focuses on the SJC community. *Finding 7* suggests involving all community members in our project to reinforce and encourage participation. Therefore, we suggest that SJC hold a parent and faculty "No Plastic" orientation before every school year. Beyond attaining parent and faculty involvement, the next step targets changing vendors plastic usage. We believe having orientations not only reminds them of the strides that SJC students are taking to be plastic free, but also promotes alternative materials for vendors to use within their own stands.

Lastly our third phase is gear toward continuously tracking these programs and initiatives for further improvement. To record the ongoing impact of SJC's efforts and ensure consistency, we suggest plastic consumption/waste be tracked and analyzed on a monthly basis. Along with keeping records of plastic use and tracking effectiveness in programs based off *Finding 3*, we suggest SJC partners with organizations to influence a positive change.

Based off these recommendations, we created a Multi-Year Action Plan for SJC, located on pages 25 through 29, with the goal of eliminating single-use plastic waste and consumption within SJC and its surrounding community. The action plan was divided into three phases containing sub-goals for each, aligning with our above recommendations. Additionally, we provided detailed information on each recommendation, how SJC can implement these recommendations, and potential future projects. Although our project primarily focuses on a school and its community, it can be altered and scaled to make a global impact for generations to come.

Acknowledgements

Firstly, we would like to thank the St. Joseph Convent School for warmly welcoming us during our visit to the school to complete our research project. We learned so much from observing the school, surveying the students and parents, and interviewing faculty and administration. The information provided by these groups allowed us to gain a great insight about plastic usage.

Secondly, we would like to thank the representatives from Chula Zero Waste, Rereef, Thai Plastic Recycle, Can Do Team, Trash Hero, Roong Aroon School and Plastic Free NIST who took the time to talk to us about their programs. Their work helped us understand what approaches would be most beneficial for our project.

We would also like to thank Ajarn Siripastr, Ajarn Esther and Ajarn Steve for their continuous support and guidance throughout our project. Their feedback was valuable in helping our team improve our writing and presenting skills, and our team dynamics. We were thankful to have had great mentors throughout this project.

Finally, we would like to thank our sponsors, the St. Joseph's Alumnae Association, for allowing us to work on a project that can be impactful and useful for the country. We would also like to thank them for guiding us in getting permission to enter the St. Joseph Convent and their feedback and excitement about our project. It was an amazing opportunity for us to learn about Thai behaviors within a school community.

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Table of Contents

Abstract	i
Executive Summary	ii
The Problem	ii
Findings and Recommendations	ii
Acknowledgements	v
Authorship	vi
Table of Contents	vii
Chapter 1: Introduction	1
Chapter 2: Background	2
2.1. Thais Plastic Consumption and Mindsets Regarding Plastic	2
2.2. Plastic Waste in Thailand and the Impacts of Plastic Pollution	2
2.2.1 What Happens to all the Plastic in Thailand?	2
2.2.2 What are the Impacts of Plastic Consumption and Waste?	3
2.3 Strategies for Reduction of Plastic Consumption and Pollution	3
2.3.1 Bans and Taxation of Single-Use Plastics	3
2.3.2 Waste Management and Recycling Programs	4
2.3.3 Incentive Programs for Plastic Reduction	4
2.3.4 Alternative Materials	5
2.3.5 Educational Awareness	5
2.4 Understanding Aspects of Making a Change	7
2.4.1 What Influences Decision Making?	7
2.4.2 Individual Change vs. Systematic Change	7
Chapter 3: Methodology	8
3.1 Objective 1: The successes and failures of Thai plastic reduction programs.	8
3.2 Objective 2: Factors that affect plastic consumption	9
3.3 Objective 3: Create a long-term action plan to be implemented in the school community.	10
Chapter 4: Findings	11
4.1 Program Successes and Failures in Reducing Plastic Use	11
4.1.1 Finding 1: Individual behavior change is difficult	11
4.1.2 Finding 2: Notable plastic reduction strategies	12
4.1.3 Finding 3: Importance of partnerships and effective marketing	13
4.2 St. Joseph Convent and the Community	15
4.2.1 Finding 4: Systems in SJC	15
4.2.2 Finding 5: Students Knowledge	16
4.2.3 Finding 6: Vendors' Plastic Use	17
4.2.4 Finding 7: Making a change in SJC	18
4.2.5 Summary	19
Chapter 5: Recommendations	21
5.1 Phase One: Within SJC	21
5.1.1 Gather baseline data	21
5.1.2 Implement a sustainability curriculum	22
5.1.3 Introduce alternative and reusable materials	22
5.1.4 A school-wide ban on single-use plastic	22

5.2 Phase Two: SJC Community	23
5.2.1 SJC communicates to parents and faculty	23
5.2.2 Orientation for vendors surrounding SJC	23
5.3 Phase Three: Continuity	24
5.3.1 Tracking of plastic use and waste inside the school	24
5.3.2 Partnering with outside organizations	24
5.4 SJC Action Plan for SJAA	24
5.5 Conclusion	25
References	31
Appendix A.1: SJC Student Surveys	35
Appendix A.2: SJC Student Response	37
Appendix B.1: SJC Parent Surveys	41
Appendix C.1: Vendors Survey	43
Appendix C.2: Vendors Survey Analysis	43
Appendix C.3: Observations Along Convent Road	46
Appendix D.1: SJAA Survey	47
Appendix D.2: SJAA Survey Responses	48
Appendix E.1: SJC Faculty Interview Questions	51
Appendix E.2: SJC Faculty Interview Analysis	52
Appendix F.1: Program SWOT Interview Questions	53
Appendix F.2: Program SWOT Interview Analysis	54
Appendix F.3: Program Analysis Summary	53
Appendix G.1: Full Deliverable	54

List of Figures

Figure 1: Oceanic Debris	ii
Figure 2: Breakdown of strategies and respective ideal target audience size	iii
Figure 2.1: A women retrieving plastic waste from an open dumping site	2
Figure 2.2: Bird consumption of plastic waste	2
Figure 2.3: Combine in One Campaign	5
Figure 2.4: Summary of Past and Present Strategies for Plastic Consumption and Pollution	6
Figure 4.1: Breakdown of strategies and respective ideal target audience size	13
Figure 4.2: Trash Hero's reusable bottle	14
Figure 4.3: Trash Hero's reusable bag	14
Figure 4.4: Water filter at SJC	15
Figure 4.5: Waste separation station at SJC	15
Figure 4.3: SJC responses to plastic impacts on the environment	16
Figure 4.4: SJC responses to plastic impacts on human health	16
Figure 4.5: How target audiences apply to SJC	19
Figure 5.1: SJC's multi-year action plan overview	26
Figure 5.2: Phase one for SJC's action plan	27
Figure 5.3: Phase one continued, of SJC's action plan	28
Figure 5.4: Phase two of SJC's action plan	29
Figure 5.5: Phase three of SJC's action plan	30

Chapter 1: Introduction

According to the American Nature Conservation Organization, the annual use of single-use plastic items totals between five hundred million and one billion throughout the world (Ar & Yilmaz, 2017). Decomposition of single-use plastics takes 450 years in water and over 1,000 years on land (Corporal, 2010). Single-use plastics are responsible for 60%-80% of all ocean trash and a large decrease in oceanic ecosystems (Gall & Thompson, 2015). Negative human health impacts due to single-use plastic pollution include malaria, cancer, and infertility (Konieczna, Rutkowska & Ranchon, 2015; Nunes, Windsor & Marks, 1999). The popularity, convenience, and resiliency of single-use plastics exacerbates these impacts (Shoji & Susumu, 2014).

Thailand leads Southeast Asia in annual consumption of plastic at 40 kg per capita (Corben, 2017). Bottled water, groceries, and plastic packaging are abundant in Thailand making them unavoidable for the average consumer. Bangkok alone produces 10,000 metric tons of trash each day, 18% of which is single-use plastic (Corporal, 2010; Gheewala, 2011). Only 35% of Thailand's total waste is disposed via recycling, incineration or collection in a landfill, the remaining 65% ends up in open-dumping sites (Kaosol, 2009; Winn, 2016). Research predicts an annual 20% increase of plastic use in Bangkok, causing not only an increase in ocean pollution but also a decrease in human health (Winn, 2016). Thailand, a global leader of plastic consumption and waste, must find a successful approach to the growing issue.

To respond to this problem, countries around the world have attempted a variety of strategies, all of which fall within the '3 R's' slogan: reduce, reuse, and recycle. Reducing plastic is more impactful than reusing plastic, which is more impactful than recycling. Other countries have attempted banning the use of plastic, creating waste disposal programs, implementing incentives to reduce plastic consumption, educational programs, or introducing alternative materials to plastic. While these kinds of efforts are helpful elsewhere, there has yet to be a significant impact on reducing plastic use in Thailand. Without an effective approach to reduce plastic, the consumption will continue to grow within the country.

With the help of our sponsors, the St. Joseph's Alumnae Association (SJAA), the goal of our project was to gain a deeper understanding of plastic use in Thailand and to develop successful plastic reduction methods in the St. Joseph Convent School (SJC). The success of our project can change Thai mindsets to be more pro-environmental regarding single-use plastics as school communities have the ability to establish sustainable practices for generations to follow. Through our research, we determined that SJC students are aware of plastic's negative impacts and SJC has systems in place to reduce plastic consumption. We have determined that the most effective strategies for reducing plastic consumption and waste within a school community are through a sustainability curriculum, the introduction of alternative materials, plastic bans and taxing, and incentives. We combined our findings within the action plan that can not only help the SJC community but can be altered to also help other parts of Thailand.

Chapter 2: Background

In this chapter, we begin by describing Thailand's plastic consumption and waste patterns along with associated impacts. Next, we analyze the successes and failures of plastic reduction strategies used in various countries and in Thailand. We conclude this chapter by focusing on important aspects of making a change.

2.1. Thais Plastic Consumption and Mindsets Regarding Plastic

Residents of Bangkok consume over 600,000 items of single-use plastic daily (Corporal, 2010). Penchom Saetang, director of Thai-based Ecological Alert and Recovery Thailand (EARTH) argued that reducing consumption of plastics in Thai society is, "very difficult because the Thai people are very familiar with the easy-going way [and] easy to use plastics" (Corben, 2017). Individuals rarely have conscious reasons for their habits, but due to familiarity, their habits become a routine (Knussen & Yule, 2008). The unawareness of plastic waste impacts will continue to manifest until a change occurs.



Figure 2.1: A women retrieving plastic in an open dumping site (Vidal, 2014)

2.2. Plastic Waste in Thailand and the Impacts of Plastic Pollution

The increased consumption of single-use plastic in Thailand leads to a parallel growth of plastic waste. Various forms of disposal systems to reduce plastic litter include recycling, landfilling, incineration, and open dumping. These disposal methods and uncollected plastic litter lead to a variety of unintended consequences including health, environmental and economic effects. Excessive utilization of single-use plastic propagates these consequences.



Figure 2.2: Bird consumption of plastic waste (Soos, 2011).

2.2.1 What Happens to all the Plastic in Thailand?

Open dumping, seen in Figure 2.1, is the most common and cheapest method for waste disposal in Thailand. Research shows, 65% of total waste generated in Thailand goes to open dumping sites (Kaosol, 2009). Nickolas Mallos, the director of the Ocean Conservancy Marine Debris Program, stated Thailand and four other Asian countries produce up to 60% of all plastic waste that enters Asian waters (Winn, 2016). Thailand is emphasizing a move from open dumping to sanitary landfilling, recycling, and incineration (Kaosol, 2009).

2.2.2 What are the Impacts of Plastic Consumption and Waste?

There are many impacts associated with plastic waste such as the spread of diseases and negative human health effects. Plastic additives and particles can leach into water sources. A common plastic additive, bisphenol A (BPA), can cause severe health effects such as infertility, breast and prostate cancer, and polycystic ovary syndrome when absorbed orally, transdermally or by inhalation (Lister & Schierow, 2010; Konieczna et al., 2015). Furthermore, plastic not only decreases the standard of living but also impacts the environment.

Waste materials from plastic disposal have significantly reduced biodiversity (Mader, 1996). Of the 6.3 billion metric tons of plastic produced between 1950 and 2015, over 60% accumulated in natural environments (Musa & Hayes 2013). Winn states there will be “one ton of plastic for every three tons of fish in our oceans by 2025” (2016). Plastic material in marine ecosystems results in over 100,000 mammal deaths, and one million seabird deaths every year as shown in Figure 2.2 (Brink & Schweitzer, 2017; West, 2014).

An increase in plastic littering not only detrimentally affects local ecosystems, but also leads to an economic burden. An estimated global economic loss from plastic pollution in marine ecosystems summed \$13 billion in 2014 (UNEP, 2014). The United Kingdom fishing industry loses approximately \$31 million per year due to the decrease in fish populations. Additionally, the shipping industry loses up to \$45,000 yearly from plastic entanglement damages (UNEP, 2014). The Asia-Pacific Economic Cooperation (APEC) estimated a loss of \$1.3 billion in Southeast Asia’s fishing, shipping and tourism industries (UNEP, 2014).

2.3 Strategies for Reduction of Plastic Consumption and Pollution

The negative effects on human health, the environment, industry and other aspects of society continue to increase as plastic use and waste increases. Countries around the world have addressed plastic issues through different approaches ranging from national bans and policy-making to smaller scale educational awareness programs. Examining different strategies and their effectiveness in other places around the world, as well as in Thailand, benefits our understanding of potential solutions that address plastic consumption.

2.3.1 Bans and Taxation of Single-Use Plastics

Banning or taxing single-use plastic is a strategy used to reduce consumption on a national scale. Over forty nations and cities have banned or taxed the use of certain kinds of plastic to reduce the negative impacts associated with them (Freitas-Tamura, 2017).

In 2008, Rwanda prohibited the “manufacturing, importation, use and sale of [plastic] bags” (Danielsson, 2017). Any breach of this mandate may result in fines, jail time, and/or public confessions (Freitas-Tamura, 2017). Rwanda focuses on a nearly complete ban on plastics, but other locations implement less strict methods. California’s bag tax began in San Francisco in 2012, charging 10 cents for every bag consumers use (Luna, 2016; SF Environment, 2016). Businesses determine and charge a fee for each bag to help incentivize participation (SF Environment, 2016). San Francisco also banned single-use plastic bottles (Levin, 2017).

Despite the positive results associated with plastic banning, many weaknesses emerge from this strategy (Alder, 2016). Firstly, plastic bans often focus on eliminating plastic bags and neglect the many other impactful plastic items such as bottles, straws, and cups. (Alder, 2016). Secondly, banning plastic bottles in countries that do not have safe drinking water can cause

illnesses (Levin, 2017). For instance, Thailand has polluted tap water sources inhibiting clean water distribution (Kruawal, 2005). Regulations to reduce the production and consumption of plastic do not exist in Thailand, but the Thai government has enacted environmental laws designed to protect the Kingdom's environment and its natural resources (Ltd, Juslaws & Consult Co., 2017). For example, a Thai government official will fine an individual if they are caught polluting the environment.

2.3.2 Waste Management and Recycling Programs

Waste separation is another method used to reduce single-use plastic waste. Proper disposal and separation of waste into categories is essential for material recovery and minimization of material in landfills (Capel, 2008). Plastic is one of the main categories in waste separation programs to ensure proper recycling.

In Taiwan, the “4 in 1” program in The Waste Disposal Act ensures separation of waste into three main categories: general refuse, kitchen waste, and recyclables (Bakshi, 2016). The system splits recyclables into eight different categories, including one for different plastic containers (Kuo-Shuh, F., Chun-Hsu, L., & Tien-Chin, C., 2005). Taiwan reduced net household waste per capita by 66% from 1997 to 2015 and increased the waste-recycling rate by 49% (Bakshi, 2016; Kuo-Shuh et al., 2005).

Three waste separation programs in Thailand are the “Zero Waste” programs at Chulalongkorn University (CU) and Roong-Aroon school, and the waste separation facility Thai Plastic Recycle. The CU “Zero Waste” program aims to improve waste-collecting and separating processes. In the Roong-Aroon school, waste-management stations focus on two concepts: separating resources from waste and turning waste into “resources” (Resource Management System, 2015). Thai Plastic Recycle is a company created to address the excess waste of plastic bottles in Thailand. The successes and failures between a recycling process like Thai Plastic Recycle and waste separation programs within schools like Roong-Aroon and CU will be explored throughout our methodology and discussed in our findings.

2.3.3 Incentive Programs for Plastic Reduction

Incentive programs provide opportunities to motivate the community to make more environmentally friendly choices in their daily life. Effective incentives develop individual habit formation when they align with personal benefits (Maibach, 1993).

A study in India regarding consumer responses to incentive programs concluded that plastic reduction programs have a positive impact in reducing plastic bag use (Gupta, 2011). Several of the shops and markets had a “cash-back” plan, which comprised a 1-2% reimbursement when using a reusable bag instead of a plastic bag (Gupta, 2011). The results showed that after implementing the incentive program the use of cloth bags increased by 11.2% in 8 weeks (Gupta, 2011).

Incentive based programs that attempted to reduce plastic waste and consumption in Thailand include Clean the Beach Boot Camp and Refun. A Muay Thai fighter runs the Clean the Beach Boot Camp where attendees help clear a section of plastic ridden beach. The attendees helped with the cleanup because they enjoyed the workout and adrenaline rush. The company, Refun, offers a monetary discount at specific stores for returning polyethylene terephthalate (PET) bottles to the Refun machine in Siam and CU areas (Refun, 2017). Incentive programs can be effective by creating a reason or a personal interest for the consumer to partake in their

initiatives. In theory, positive incentive programs are effective, but only a few people take advantage of the incentive. Consumers only respond to simple encouragement for so long before reverting to their initial habits (Lee 2010). Our methodology chapter investigates the possibility of implementing incentive programs like Refun and Clean the Beach Boot Camp; this investigation is discussed in our results chapter.

2.3.4 Alternative Materials

The bioplastics industry emerged from the efforts to minimize plastic waste and maintain the convenience single-use plastics provide. Bioplastics functionality is like conventional plastic products, but are composed of biodegradable, compostable materials (McKenna, 2015). Initiatives to use alternative materials, such as bioplastics, to reduce plastic pollution might stimulate new businesses and create a more sustainable future.

The bioplastics industry produces disposable bio-based utensils, dishes, and packaging (McKenna, 2015). A restaurant in Nebraska, The Grey Plume, uses disposables made from recycled, biodegradable or compostable materials. While this initiative sounds ideal, many downsides arise when using bioplastics as an alternative material. Production of bio-plastics and other alternatives require large amounts of water, pesticides and fertilizers, releasing large amounts of pollution into the environment (McKenna, 2015). Biodegradable materials struggle to compete with the conventional plastic industry, as they are more expensive and less convenient (McKenna, 2015).

The restaurant, Broccoli Revolution in Bangkok, has made strides to reduce plastic by giving patrons rigid, waterproof morning glory stems as an alternative to plastic straws. Broccoli Revolution also provides its customers with plant-based food containers and bioplastic cutlery (Jiralertpaiboon, 2017). Similarly, Plastic Free NIST, a service group in NIST international school in Thailand, is in the process of providing bamboo straws to students in their school. We will explore this strategy in our methodology to determine if alternative materials are feasible for a school or its surrounding community and discuss it in our results chapter.

2.3.5 Educational Awareness

Education is a strategy that provides information about plastic use and its impacts to change the perspective and behavior of the audience. Many campaigns use educational programs to provide awareness to their participants. However, research shows that although educational awareness informed the audience, it did not change people's plastic usage behaviors (Chib, A., Chiew, H. J., Kumar, C., Choon, L. G., & Ale, K., 2009).

In Cambodia, many citizens use plastic bags as a convenience item despite the country lacking a plastic waste management program. To address this issue, governmental groups created the Combine in One Campaign, which targets vendors and consumers. This campaign teaches vendors to reduce the number of plastic bags they give consumers. Representatives hung signs, wore aprons, distributed large plastic



*Figure 2.3: Combine in One Campaign
(Thomas, 2011)*

bags and encouraged consumers to “Combine in One” as seen in Figure 2.3 (Project Newsletter Jan/Feb 2017, 2017).

A second focus for the Cambodian government is educating youth. The government supports a program dedicated to educating children in schools on how they can play a role in creating “cleaner and greener” communities (Project Newsletter March/April 2017, 2017).

Trash Hero is an educational and community-based program in Thailand devoted to addressing plastic consumption. The program’s mission is to “create sustainable, community-based projects that remove existing waste, and reduce future waste by inspiring long-term behavior change” (Peter, 2018). This campaign teaches people how to refuse plastic products through videos and volunteering activities such as paddle boarding trash pickups (Peter, 2018). Understanding educational programs’ successes, failures, and techniques, will influence our deliverable for our project.

To conclude, there have been many attempts to reduce plastic waste and consumption in Thailand. Figure 2.4 summarizes the negative and positive impacts associated with each of the discussed strategies utilized by other countries to reduce single-use plastics. These impacts are crucial for understanding how to approach the problem in Thailand.

Strategy	Countries	Pros	Cons
Bans and Taxation of Single-Use Plastics	Rwanda, USA (San Francisco)	<ul style="list-style-type: none"> - Direct reduction - Reduced the negative environmental impacts - Economic benefit for tax collector 	<ul style="list-style-type: none"> -Inconvenient (radical) - Increased crime rate
Waste Management Programs	Taiwan	<ul style="list-style-type: none"> -Reduced net waste -Increased recycling -Built habits 	<ul style="list-style-type: none"> -Does not reduce use of plastics -Little recycling of plastic
Incentive Programs	India, Thailand	<ul style="list-style-type: none"> -Increased participation (motivates) -Reduced use of plastic bags -Could apply to other single-use plastics 	<ul style="list-style-type: none"> -Not a long-term solution -Limited audience (those who shop)
Educational Awareness	Cambodia, Thailand	<ul style="list-style-type: none"> -Could translate to all single-use plastics -Active participation (collaboration) 	<ul style="list-style-type: none"> -Limited audience (little outreach)
Alternative Materials	United States, Thailand	<ul style="list-style-type: none"> -Alternatives for plastic -Creates jobs and new industry 	<ul style="list-style-type: none"> -Expensive -Not entirely environmentally friendly

Figure 2.4: Summary of Past and Present Strategies for the Reduction of Plastic Consumption and Pollution

2.4 Understanding Aspects of Making a Change

This section discusses the potential methods and sources needed to create a change. Two factors related to changing plastic consumption is understanding decision making and whether to focus on the individual or on systems. These are important aspects to understand because it provides a criterion for why strategies to reduce plastic are effective or not.

2.4.1 What Influences Decision Making?

Decision-making is a vital aspect in creating change. Richard Thaler, the author of *Nudge*, said, “If you want to encourage people to do something, make it easy... or even better, automatic.” Nudge Theory contributes to behavioral economics and how to influence consumers to make better decisions. Thaler conceptualized this idea by relating individual decision making to two main principles: biases in decision-making and influences from the social environment (Johnson, 2012).

The first principle of decision making is the effect biases have on them. Choice architecture is one form of bias as it refers to the structure and presentation of choices. Depending on the situation, positive or negative biases influence decision-making (Johnson, 2012). For instance, the default is for immediate bagging of items at the customers convenience. However, this habit promotes unnecessary plastic consumption for items that don’t need a plastic bag. This is an example of negative choice architecture because of the overuse of single-use plastic. However, choice architecture can endorse positive behavior through altering the default by not providing a plastic bag unless requested upon by the decision maker.

The second principle in decision making is the social environment. Placing responsibility on the people involved with the problem does not always result in a solution as “behavior-change models [do] not sufficiently empower people...” (Binns & Low, 2017). A more systematic approach is necessary for national issues such as reducing the consumption of single-use plastics. We will further investigate this concept of individual vs. system change in the context of Thailand’s need for plastic reduction.

2.4.2 Individual Change vs. Systematic Change

To make the best change within Thailand, we want to focus on reducing plastic rather than reusing or recycling. Two options for intervention are the individual or the system.

Individual change coincides with disrupting routine behavior to create new habits. Changing an individual’s behaviors may initially be appealing, but relies heavily on what *should be* instead of *what is* (Hendry, 2003). Although some individuals may support making a change, it is difficult to rely solely on them to solve the problem of plastic consumption, especially since individuals tend to gravitate towards easy habits.

The second place of intervention is changing the system and its stakeholders to eliminate individual inconsistencies. Plastic production, distribution, and sales are examples of systems in our project. Changing or making improvements to the system is a slow but cumulative and influential process that changes infrastructures, behaviors, and cultures (Pulford, 2010). Aligning choice architecture and system analysis with further comparison in our findings, will advance our project toward formulating tangible deliverables. In the next chapter, we describe our methods of research that will allow us to gain information to meet our project goal.

Chapter 3: Methodology

The goal of this project was to gain a deeper understanding of plastic use in Thailand to suggest a plan to reduce plastic waste and consumption. Through our partnership with SJAA we focus our project on the community in and outside SJC. Thailand. To achieve this goal, we have developed a set of three objectives:

1. Evaluate the successes and failures of current Thai plastic reduction programs.
2. Identify factors that affect plastic consumption in a Thai school and its surrounding community.
3. Create a long-term action plan to be implemented in the school community.

3.1 Objective 1: Evaluate the successes and failures of current Thai plastic reduction programs.

Our objective aimed to look more closely at previous methods used within Thailand to identify systems, benefits, obstacles, and evaluation measures within these programs. To accomplish this objective, we interviewed and analyzed programs that focused on decreasing plastic use and waste management initiatives throughout the country. We took into consideration the programs' overall goal, location of operation, target audience, and what they consider their successes and challenges to be.

Our method of gaining this information included research and interviews. After researching Thai plastic reduction programs, we contacted them via email and sent a formal invitation to participate in our research. If program directors chose to participate, we provided them with a full proposal, consent form, and interview questionnaire to look over prior to our visit. Programs who responded to help were: Trash Hero, Chula Zero Waste, ReReef, Plastic Free NIST, Can Do Team, Roong Aroon Zero Waste, and Thai Plastic Recycle. The interviews were audio recorded and conducted at the time and location most convenient for the interviewee. We transcribed, translated when necessary, and analyzed the interviews once completed. The whole team carried out interpretations and analysis of the responses.

Our team based the questions for these interviews on a Strength, Weakness, Opportunity, Threat Analysis (SWOT) as seen in Appendix F.1. This guide has proven to be applicable to community development projects and provides paths to explore various potential benefits and downfalls, both internally and externally (Renault, 1993). We analyzed the information by taking all quantitative data obtained and exported it for summarization into charts and graphs for trend identification. Qualitative data was analyzed inductively as we have not had a predetermined theory being so far removed from the current issue (Burnard, 2008). Analyzing open-ended questions in both our interviews and surveys required a thematic coding framework for categorizing responses by keywords and topics or important phrases. This approach enabled us to summarize key themes that emerged from the data.

There were several limitations in using this method. Since we identified specific individuals to interview, we depended on their availability. Once we scheduled interviews, information and analysis came in on a rolling basis making data collection disorganized and difficult to manage. Other disadvantages to this method included data lost from translations or technical issues during the interview analysis and recording, making the quality of the data somewhat unreliable. Aside from this recognized obstacle, interviewing allowed for a more

personal connection between the researcher and participant which led to detailed and informative discussions.

3.2 Objective 2: Identify factors that affect plastic consumption in a Thai school and its surrounding community.

The purpose of this objective was to understand what influences Thais' plastic consumption in SJC and its community in Bangkok. Our focus was on systems in the school that influence plastic consumption which included social disposal and authority systems. *Section 2.4.2* in our background research supports the belief that improving systems provides a greater plastic reduction impact. Our group identified these systems and we sought to gather more information from research methods such as observations, surveys, and interviews.

Observational research is an effective method used to comprehend the behavior of research participants with a fresh perspective (Goldstein, 2017, Kawulich, 2005). This method focused on answering questions such as what types of disposal methods or systems are available, what setting is plastic used most frequently, and how consumers use it. Field analysis of SJC included photographs of plastic we saw in the cafeteria, school grounds, vendors, and stores surrounding the campus. This information narrowed the scope of questions that required answering in our surveys and interviews. Furthermore, it served as a brief introduction to the extent the community uses plastic, but only provided a surface overview of plastic consumption within the target area.

Anonymous quantitative surveying was the second method of research for this objective as it provides more genuine and valid answers that coincide with the behaviors, needs, and opinions of people (Hampton & Vliela, 1995, DeFranzo, 2012). To guarantee the smallest margin of error, we first piloted a survey on CU Bachelor Science of Applied Chemistry (BSAC) students. We used this survey to test the comprehension of questions and quality of information we gathered, especially on the short answer questions. After making changes to the piloted survey, SJC distributed 400 surveys amongst English and Thai program students in grades six through eleven. We received 377 student responses. This survey contained questions in several forms including multiple choice questions, Likert scale questions, and short answer questions (*Appendix A.1*). The multiple choice and Likert scale questions were analyzed based on percentages and frequency of answers. A coding system evaluated the short answer questions and quantified responses into categories for visual display. The feedback collected from students contributed heavily to our recommendations. Similar surveys were sent to participants' parents (*Appendix B.1*) to gauge plastic consumption at home and determine interest in reduction initiatives. Additionally, vendors that surround the school grounds were surveyed with two short-answer questions to understand why they use plastic and if they would be open to using a different material from plastic (*Appendix C.1*). We evaluated these short answers the same way as the short answer questions in the survey provided to the SJC students. Next, we surveyed alumnae through the SJAA database. This survey consisted of mostly open-ended questions to find out if the alumnae were willing to help SJC become plastic free and what strategies they thought would be best to implement (*Appendix D.1*). Surveying these groups gathered opinions, trends, and recommendations within the SJC community and determined the vendors opinion of plastic use and alternatives. Challenges in surveys were evident in open-ended answers due to the lack of reason and explanations in them. Vendors were equally unforthcoming with lengthy explanations and opinions surrounding their plastic use.

Lastly, interviewing aided our research by allowing us to gain a personalized understanding of the problem (Hampton & Viela, 1995). Faculty and administration were our focus because of their influence on student's decision making. We conducted the interviews in person through a semi-structured format. Questions focused on the 'why' and 'how' plastic is used in SJC (*Appendix E.1*). To analyze the interviews, we used qualitative analysis in a similar way to objective one interviews. The information collected deepened our understanding of behaviors regarding plastic consumption. Challenges associated with this objective included receiving permission from the school to survey students, parents, and interview faculty.

3.3 Objective 3: Create a long-term action plan to be implemented in the school community.

The completion of the previous objectives provided us with an understanding of what systems limit individuals from minimizing plastic consumption and maximizing reduction. For the third objective, we combined the information from objective one with the data from objective two to create a multi-year action plan that will reduce plastic. This action plan includes a criterion of what is necessary for a successful project based on our evaluation of current Thai plastic reduction programs. Our team determined the foundation for this criterion through online research of other project guidelines and modified them to reflect what is most effective in Thai society. These guidelines do not exclusively target schools but are also adaptable based off target group areas and sizes. Having flexible and clear guidelines will enable SJAA to develop programs and events that can promote and establish good habits regarding plastic usage in the school's community and eventually expand to the outside community as well.

Chapter 4: Findings

The goal of this project was to gain a deeper understanding of plastic use in Thailand to suggest a plan to reduce plastic waste and consumption. In this chapter, we will present and discuss key findings from our observations, surveys, and interviews. We identified seven key findings:

1. Individual behavior change is difficult and inefficient.
2. Plastic taxing, incentives, introduction of reusable materials, and educating youth are notable strategies for systematic changes to reduce plastic.
3. Programs are strengthened by partnerships and effective marketing techniques.
4. There are systems in place at SJC to reduce plastic waste and consumption.
5. Students are aware of the consequences associated with plastic use.
6. Vendors use plastic products but are willing to change their habits.
7. Focusing reduction on certain areas and items, along with community support, is important to make a change at SJC.

4.1 Program Successes and Failures in Reducing Plastic Use

The first objective was to evaluate the successes and failures of plastic reduction programs in Thailand. It was important for us to understand the best approaches to reduce plastic and what factors strengthen these approaches. To obtain this information, we interviewed a variety of programs and companies including Chula Zero Waste, Rereef, Roong Arong School, Plastic Free NIST, Can Do Team, Trash Hero, and Thai Plastic Recycle. *Appendix F.3* contains a summary of the purpose and goals for each of these programs. Each of these organizations gave us insight on the challenges and successes they found while addressing the plastic problem. Below we describe our findings gathered from these interviews.

4.1.1 Finding 1: Individual behavior change is difficult

Through our interviews, we found that individual behavior change is difficult and inefficient. The Roong Aroon School's "Zero Waste" program stated one of the initial weaknesses of their waste separation system was their target audience lacked the personal motivation to participate. The group of students leading NIST's sustainability project also concluded that changing people's behavior was an obstacle. Furthermore, the director of Chula Zero Waste, Dr. Sujitra Vassanadumrongdee, stated consumers are less likely to make pro-environmental decisions even knowing that plastic is harmful to the environment. The director proceeded to say that, "You have to... make it easy for them to change their behavior, make it convenient for them..." (*Appendix F.2*). In response to this obstacle, programs focused on making plastic reduction easier for consumers through system and infrastructure changes.

The data obtained through our interviews suggests that programs are more effective through system changes rather than individual changes. This finding aligns with our background research that individual change is less effective than systematic change. *Section 2.4.2* explains that modifications to systems and defaults enable individuals to incorporate new behaviors and habits into their everyday routine. Our research strengthened the conclusion that individual change is not effective and systemic change is favorable. Although systematic changes sound ideal, they can only be made with involvement of stakeholders that manage the specific systems.

Lack of coordination between necessary actors prevents the modification of these systems. This limitation should be considered when developing a program that aims to change habits.

4.1.2 Finding 2: Notable plastic reduction strategies

Successful programs require effective strategies for creating system modifications. We found through our program interviews, plastic taxing, incentives, introduction of reusable materials, and educating youth are notable strategies for systematic changes to reduce plastic.

When Chula Zero Waste introduced a plastic bag tax on campus, consumption of plastic bags decreased by 90%. Can Do Team noted a link between a tax or incentive and behavior in the Thungkhru district, “when [people] benefit economically they change immediately”. This shows how individuals will change their behavior for their own benefit. Implementing a tax or an incentivized discount is an example of changing the social environment to encourage pro-environmental behavior as described in our background chapter.

Plastic Free NIST recommended providing alternative materials to make it easier for individuals to reduce their own plastic consumption. Rereef has worked to reduce plastic straws by providing rice stem or morning glory stem straws as an alternative. They have reportedly “reached over 200,000 people” and believe giving alternatives empowers the consumer to make more sustainable decisions. This method aligns with the concept of choice architecture as a part of Nudge Theory highlighted in *Section 2.4.1*.

All the programs interviewed stated they incorporated educational awareness into their program. The most common weakness program directors identified when discussing educational awareness efforts was changing older individuals’ habits and behaviors. The Chula Zero Waste Director indicated when college students were put through the education sector of her program they, “don’t listen... [they] just look at their mobile phones, they don’t even care.” With an older generation, educational awareness may not be enough to change habitual behaviors. When asking program directors if they had any recommendations for us, many stated educating at a young age may be beneficial. A Trash Hero representative stated, “Reaching the younger audience, that’s the biggest impact... when we shape the minds of younger generations.” It is important to acknowledge that there is no concrete information that supports educating younger generations is guaranteed to be effective. The CEO of Starboard, a company partnered with the Bangkok Trash Hero chapter stated, “It is really hard to reach people.” He suggests educating is not enough to make a change and additional strategies should be utilized. We conclude from this information that education might be effective with younger generations but should be paired with other strategies to make a larger impact.

After analyzing program interviews, we determined that the variety of effective strategies used to reduce plastic is dependent on the size of the target audience. Through our interviews, we found that community involvement, educational awareness and waste separation programs work better with smaller populations. For example, Trash Hero, a community-based program with cleanup activities, has multiple chapters throughout Thailand. The director found that their island chapters are more effective than the Bangkok chapter because it is a large city with a larger population. Additionally, Roong Aroon school has an effective waste management system that operates well within their smaller school community.

Incentives and business cooperation are methods that can work on a larger, city-wide scale. Our background research justifies this as multiple stores and markets throughout India implemented an incentive program to reduce plastic use (*Section 2.3.3*). Businesses often have a

larger impact beyond that of their local community. Thai Plastic Recycle is an organization that has reached a larger, city-wide audience.

On a national-level, we found industry regulations, taxing and banning are effective. Rwanda reduced plastic consumption on a national scale by imposing bans and industry-restrictions (*Section 2.3.1*). While these methods may not be effective at a nation-wide scope currently in Thailand, their level of impact is important to consider when developing a plastic reduction program.

There is a variety of strategies that can address the plastic consumption problem in Thailand. Taxing, incentivizing single-use plastic, providing alternatives, and educating youth are a variety of strategies that can successfully reduce plastic consumption by targeting the issue from multiple angles. Additional strategies that were found and analyzed throughout our interviews with program directors can be found in Appendix F.3. Based on our research in our background and first objective we have determined that strategies work more effectively within certain target audience sizes. Figure 4.1 illustrates this conclusion. Each main strategy we observed falls within 3 categories: the local community, city-wide or nation-wide.

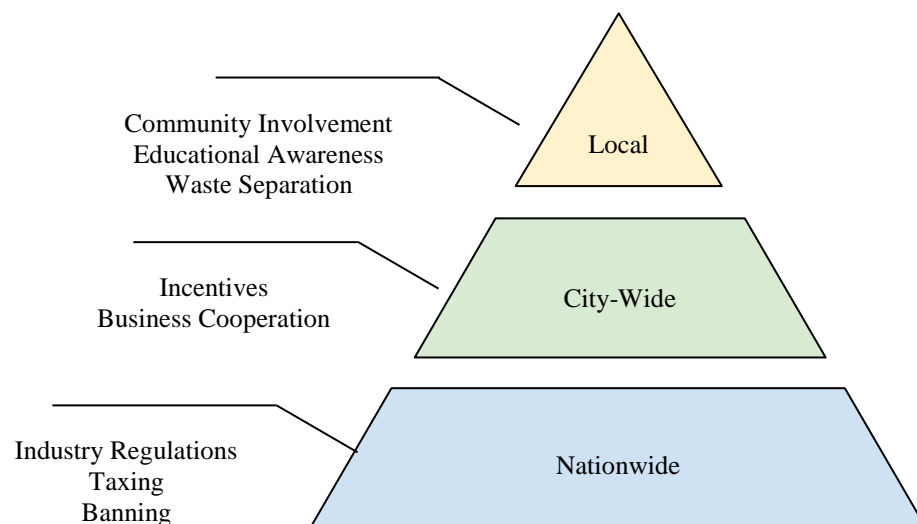


Figure 4.1: Breakdown of strategies and respective ideal target audience size.

4.1.3 Finding 3: Importance of partnerships and effective marketing

Our second finding identified the most notable methods to use to reduce plastic within systems. We used our first objective to understand what factors make these programs strong and long-lasting. Through our interviews, we found partnerships and effective marketing techniques strengthen programs.

Plastic Free NIST's sustainability program succeeded in making their goals realistic due to their various connections to community members and powerful figures. They built a connection with 'Bamboo Now,' a bamboo straw supplier, to bring an alternative material into their school. Moreover, they stated a key strength in their program is "getting powerful people on board so that they can make the change." Can Do Team spent years developing close relationships with their local community. This relationship allowed the programs target audience

to gain a deep understanding of the programs goals and encourage participation. Strong connections may lead to a larger impact with more active involvement.

Partnerships can allow a program to overcome the challenges associated with changing systems as described in our first finding (*Section 4.1.1*). Relationships with multiple actors can allow for efficient system alterations. Support from governmental, non-governmental, and private sector organizations can potentially make drastic changes within a community. For example, if a school coordinated with vendors in the surrounding area to limit their plastic use, the school could spread their pro-environmental mindsets beyond the campus. Having multiple partnerships can be difficult to coordinate and communicate with. For example, Chula Zero Waste's partnership with authoritative groups led to unreciprocated efforts and a general lack of communication. This limitation could be overcome with the development of clear goals and expectations from involved partners. We conclude that a larger impact presents itself when a program receives more support and participation from various entities.

Besides strong partnerships, effective marketing techniques strengthen a plastic reduction program and expands its impacts. Trash Hero stated one of their greatest limitations is spreading the word about their projects to the community. They found that their Bangkok Facebook page was not as effective as they hoped it would be. They used branding to make their target audience aware of their message. Their slogan "we clean, we educate, we change" summarizes their purpose. Additionally, their reusable materials contain their logo, as seen in Figures 4.2 and 4.3, to further advertise themselves. Chula Zero Waste struggled to spread awareness of their program when they used informational posters. The director explained "we put the big cutout like the plastic straw in the turtle nose but many CU people still use straw, so it doesn't create much impact." They began using a variety of media outlets such as broadcasting on TV screens in canteens. Other programs, such as Rereef, found success through social media marketing where they've grown to have approximately 7000 campaigns.



Figure 4.2 and 4.3 Trash Hero's reusable bottle (left) and bag (right) (Peter, 2018)

From this information we identified marketing as a key factor for a successful program. Marketing and advertising promote active involvement and awareness of a program which is key to making long-lasting impacts. We found it interesting that Trash Hero struggled to connect with its audience through social media while Rereef found it to be a strength of their program.

Posters were determined to be not as effective when it came to spreading awareness and having an impact on behavior as seen with Chula Zero Waste. Trash Hero and Plastic Free NIST employed the method of “branding” their program using logos, merchandise, and slogans. This finding highlights the pros and cons of a variety of advertising strategies, but more research can be done to see what is most efficient for marketing a program.

4.2 St. Joseph Convent and the Community

Once we gained an understanding of successful and unsuccessful plastic reduction program factors, we used our second objective to determine how we can apply this information to the SJC community. It was important for us to focus on SJC and its surrounding area to gain a full understanding of where and why plastic consumption or waste was prevalent. First, to understand the school environment, we carried out campus observations, surveys with students, parents and alumnae, and faculty interviews. Secondly, we interviewed vendors on the street outside SJC. Below we describe our findings.

4.2.1 Finding 4: Systems in SJC

From Finding 1, we understood that our project would focus on system change as opposed to changing the individual. Our first task in SJC was to see what systems are currently in place to reduce plastic waste and consumption and how frequently they were used. Through observations, student surveys, and teacher interviews, we found that there are systems in place at SJC to reduce plastic waste and consumption. During our visit, we found that the school has 27 water filters (Figure 4.4) throughout the building and many waste separation stations (Figure 4.5) on the main floor. The waste separation stations splits SJC’s waste into five different categories: general plastic, paper, fruit and vegetable garbage, plastic bottles and plastic cups.



Figure 4.4: Water Filter at SJC



Figure 4.5: Waste Separation Station at SJC

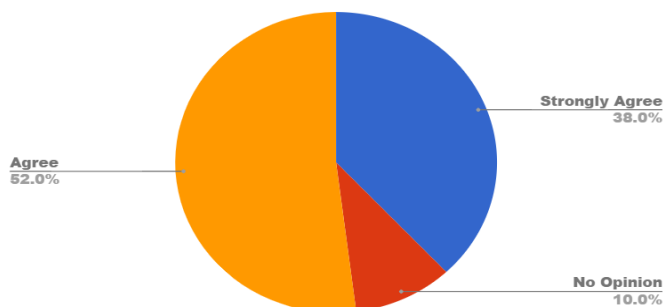
Through SJC student surveys, we asked if students knew about their school’s plastic waste system and if they used the system (Appendix A.2). Most students responded that they knew their school had a program about plastic waste or use. When asked how strictly students followed their school’s program, 62% said they sometimes follow the program and only 33% of students responded that they strictly follow it. We also asked SJC teachers their thoughts on

student behaviors when it came to using the waste separation stations and water filters (*Appendix E.2*). All the teachers interviewed said students know they are supposed to separate their waste. Ms. Tracy¹, a science teacher stated, “We have different trash bins, so students should know, but whether they do, I don’t know, it is hard to tell.” Additionally, all interviewed teachers mentioned that they see students using the water stations. Mr. Bob², a science teacher of grades 1-3, 10 and 11 stated, “The younger ones have water bottles, metal ones normally, and they fill it up and reuse those, the older kids do not. You will see the older kids with the plastic bottles.” Of the 385 student responses we collected, 66% students said they use a reusable water bottle but only 46% students said they use the water filter. Additionally, 72% of students use a reusable tote bag, but according to the survey students still use plastic items. Out of the students surveyed, 46% said they used plastic bags the most and 29% said plastic bottles because they are given to them and they are convenient.

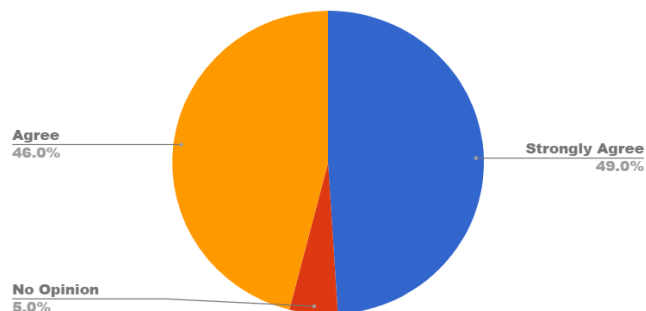
Although the utilization of the water filter and separation station is not maximized, we can conclude that plastic waste and consumption in SJC is not due to the lack of a waste management program or clean water sources. We found it interesting that although SJC has these systems there is room for improvement to reach strict participation from all students. A reasoning for this relates to our conclusion that effective marketing materials promote the use of these systems, as explained in *Finding 3*. Additionally, the younger students use reusable water bottles more than older students. Reaching the older students as a target audience requires further exploration to ensure they also take advantage of the systems in SJC. Although students use reusable water bottles and bags at school, single-use plastic bags and bottles are still used frequently. There must be a way to make reusable water bottles and tote bags more convenient than single-use plastic items. If students do not routinely follow or use the systems in place at SJC, plastic waste and consumption will continue to grow.

4.2.2 Finding 5: Students Knowledge

Through our student surveys (*Appendix A.2*) and teacher interviews (*Appendix E.2*), we found that students are aware of the consequences associated with plastic. When asked for students opinion on whether “plastic waste is harmful for the environment”, 49% of students answered that they “strongly agreed” with the statement and 46% of students said they “agreed.” Only 5% of students had “no opinion” on this statement while none explicitly disagreed. Additionally, we asked students for their opinion on if plastic waste is bad for human health.



Figures 4.6: SJC responses to plastic impacts are harmful to the environment



Figures 4.7: SJC responses to plastic impacts are harmful to human health.

¹ Names were changed for confidentiality purposes

² Name was changed for confidentiality purposes

Of the students who answered this question, 38% responded “strongly agree” and 52% of responded “agree.” Ten percent of students who answered this question stated they or had “no opinion” on this statement. Figures 4.6 and 4.7 display the responses to both questions. From this information, we discovered that students are more educated on the harms plastic has on the environment than on human health.

Through our pilot survey, described in our methodology Section 3.2, we asked BSAC students similar questions. Of the 90 responses we received from BSAC students, 77% of students believe plastic waste is very harmful to the environment and the remaining students said plastic waste is kind of harmful. With the question “can plastic waste and pollution be bad for human health”, 88% of BSAC students responded yes. Considering a larger percentage of BSAC students strongly acknowledged the impacts of plastic, students at the college level seem more educated on the negative impacts of plastic than those at the middle school and high school level.

Through our interviews, we asked SJC teachers if they incorporate the impacts of plastic into education. Of the teachers interviewed, all indicated that students learn about the impacts of plastic on the environment during their fifth-grade science class. Interviewed teachers also believed in the benefits involved with introducing the education of plastic impacts earlier in the curriculum. Ms. Tracy, informed us that her curriculum consisted of a unit called “Saving the Planet Earth.” She brought the textbook she used and pointed out the part in the textbook that focused on plastic. She stated she educated students on “how [plastic] produce[s] pollution, acid rain, and global warming”. Additionally, a teacher from the Thai program stated, “teachers who teach elementary health and science will teach students about impacts of plastic to the environment but not in detail.” This suggests that SJC does not provide all students with the same environmental curriculum. From data collection, the SJC curriculum primarily focuses on the impacts plastic has on the environment and not on human health. We are not able to draw conclusions encompassing the entire school curriculum since our data collection was limited to grades 5 through 11. Introducing the consequences that plastic has on the environment and on human health into the elementary curriculum may benefit SJC student’s level of knowledge.

4.2.3 Finding 6: Vendors’ Plastic Use

Through observations and interviews, we found that vendors use plastic products, but are willing to change their habits. We made 4 main observations regarding vendors’ plastic use. Images of these observations are in *Appendix C.3* These include:

- Vendors most frequently use plastic packaging.
- Plastic cups, lids, and straws are frequently used for drinks.
- Plastic litter was an issue in some parts of the community.
- There were few trash receptacles on Convent Road, the road SJC is on.

Two main areas of improvement for vendors are cups and packaging. Determining how vendors can either change the material they use or use less material for their drinks and packaging patterns will be beneficial for reducing plastic.

We interviewed vendors to understand why they used plastic and if they would make a change. *Appendix C.2* contains the responses of these interviews. We found that seven out of the ten vendors interviewed stated they used plastic because it is convenient. The toy vendor stated, “Mainly, I use plastic bags because they are convenient, and consumers still want plastic. Actually, the cost of plastic is not that cheap” (*Appendix C.2*). When asked if vendors would eliminate plastic or use less plastic, most vendors responded that to make a change, they need information about an alternative. The change would need to benefit them economically and/or

the alternative material should not affect their product's quality. The grilled pork vendor responded to the question saying, "I will use [an alternative] if the price is the same as plastic because the price of non-plastic materials are more expensive than normal plastic and I want a material that can keep the oil from pork." Additionally, during our interviews with vendors, we discovered that SJC has placed rules within the school that influenced vendors to make a change. While interviewing the bread vendor, they stated, "I used to use foam before I used plastic, but when SJC banned using foam, I used plastic instead" (*Appendix C.2*).

Learning that SJC has made an influence on vendors product use informs us that SJC can most likely influence a change again. The pressure vendors received to alter their habits is an example of SJC changing the social environment as defined in *Section 2.4.1*. Vendors are willing to make a change, but further investigation into a material that aligns with their preferences should be completed. Our claims are limited because we only talked to ten vendors on Convent Road, which is populated by vendors. We also are unsure if all vendors used to use foam products and now use plastic products because of the SJC ban. It could be beneficial to gather more information on the impact of the ban on foam. The completion of vendor interviews gave valuable insight into their plastic consumption and relationship with SJC.

4.2.4 Finding 7: Making a change in SJC

Through surveying alumnae, parents, students, and interviewing teachers, we found focusing reduction on certain areas and items, along with community support, is important to make a change at SJC. To determine which areas have the most plastic use, we asked teachers and alumnae where they thought plastic was most used. Teachers answered that the canteen is where the most plastic waste comes from and alumnae answered that, "food places" in and around SJC cause the most plastic consumption (*Appendix E.2*). Furthermore, a high authority figure in SJC, answered that the canteen was the area that used the most plastic. This information provided our team with insight on what we need to incorporate in our action plan to be effective. For instance, focusing our efforts on reducing the use of plastic within the canteen makes the program more efficient.

After collecting data on areas and plastic items, we sought to determine what other factors would support the school's efforts. Overall, teachers are knowledgeable of the school's operations and what would work well in the community. Including parent participation into SJC's program would strengthen it, as stated during our teacher interviews. When asked how to reduce plastic in SJC, Ms Tracy answered, "I think parents should be the ones, you know we can only do so much in school, but the parents should have a great influence on their child..." When asking parents if they would support a plastic program for SJC families 99% of parents answered that they would. Additionally, we surveyed alumnae and parents about what sort of program to reduce plastic they would support. The most popular answer from the compiled surveys was to introduce an alternative material into SJC (*Appendix D.2*). The teachers we talked to not only told us that parents need to be involved, but also gave feedback on banning as a potential strategy. Despite research found in *Section 2.3.1* of the background chapter shows banning as an effective approach, teacher interviews expressed concern with immediately banning plastic in SJC but believed would benefit the school if gradually implemented. Mr. Bob, shared his thoughts about banning single-use plastics within SJC stating, "I think that that's a really good idea it may be a little bit of a shock because if you walk outside its plastic everywhere and then you walk in here and it's like no plastic..." This information provided our team with insight on what aspects our action plan should incorporate to be effective. For instance, reducing the use of

plastic within the canteen focuses the program and makes it more efficient rather trying to apply reduction methods in areas of the school with little plastic consumption.

Additionally, gathering opinions and ideas of the community will make the program more influential. The large influence of campus leaders and teachers can play a strong role in our action plan. Gauging teacher's opinions on a school-wide ban informed us that it should not be implemented immediately but would be more effective if it followed after other reduction methods. Learning that parents and alumnae would like to see the implementation of an alternative material supports the inclusion of this strategy within our action plan. When developing our action plan, we considered not only what reduction methods are shown to work, but also which ones would be well received by the community. While this finding is supported by our data, it should be noted that focusing on the canteen, parent and teacher involvement, alternative materials and banning are not the only factors that have an impact on this issue. More research could be carried out to determine additional areas of focus or influence.

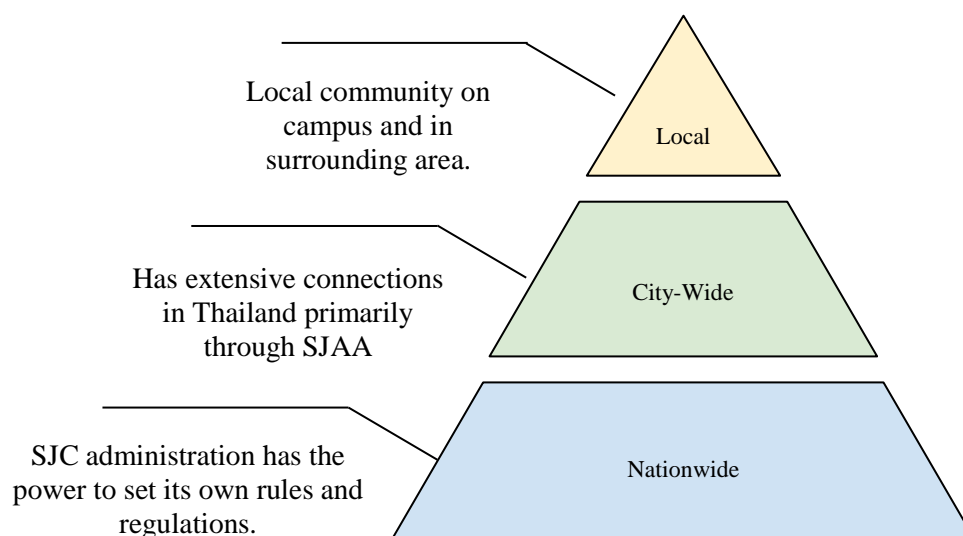


Figure 4.8: How target audiences apply to SJC

4.2.5 Summary

In this chapter, we discussed key findings from our empirical research. These findings gave us insight on how a program should be organized, what strategies should be used, and a strong focus should be on changing the system rather than the individual. Furthermore, we discovered important information relating to the SJC community and important stakeholders that should be involved to effectively reduce plastic consumption.

While developing these findings, we realized that SJC can align with various target audience strategies. This concept is illustrated in Figure 4.8 and is additionally supported by Figure 4.1. The school acts as its own local community within its walls. This means it has potential to effectively implement community involvement, waste separation, and educational awareness programs. Building upon the local community, SJC has a large number of connections through vendors on Convent Road, parents, SJAA, and various school partners. These connections could allow SJC to spread programs throughout the community and develop partnerships with businesses. Finally, similar to a nation, SJC's administration establishes rules

and regulations similar to an authoritative power. This administration has the power to establish plastic charges or bans in the school. In the next chapter, we will combine our findings and the above concept to make conclusions and recommendations to SJAA.

Chapter 5: Recommendations

In this chapter, we discuss 8 recommendations for SJAA to implement in the school and within the SJC community. These recommendations are:

1. Collect baseline data on plastic waste and consumption
2. Introduce sustainability into the SJC curriculum
3. Introduce alternative materials in SJC
4. Implement a school-wide ban on single-use plastics
5. Have a parent and faculty “No Plastic” orientation
6. Have a vendor orientation
7. Continuously track plastic consumption data
8. Have active partnerships

Our recommendations focus on how SJC and the surrounding community can become more successful in reducing plastic consumption and waste. Through the completion of our first two objectives we believe if SJAA implements these recommendations, SJC will become a plastic-free leader for other schools and organizations. We split our recommendations into three phases. Phase one focuses on recommendations for inside the school. The second phase recommendations are based on the SJC community with two main groups: parents/faculty and vendors. The third phase tracks changes in plastic consumption and disposal behavior and recommends partnerships to ensure longevity.

5.1 Phase One: Within SJC

5.1.1 Gather baseline data

Our findings showed that plastic bags and bottles were the most frequently used plastic items in SJC. Through *Finding 5* we found that students know about plastic programs within their school, but don’t always follow it. Although we collected empirical data about plastic usage in the school, we could not gain baseline data of how much plastic students consume regularly. To ensure success in SJC, we recommend the first step be to collect baseline data. This information will allow SJC’s administration to track progress in the school once a program is implemented. One way that SJC can collect this data is to record how many plastic items the shops within the school sell each day. This will give shops a starting point and an understanding of their plastic consumption. Another method is by weighing the amount of plastic waste gathered at the end of each day. We know from observations that SJC has waste separation stations separated by five categories, three of which separate general plastic, plastic bottles, and plastic cups. If SJC records the composition and volume of these bins, the school will have baseline data of how much plastic is disposed of throughout the day. One limitation we see with this recommendation is that we are unsure how quickly SJC sells their waste to a waste collector. If they sell their waste immediately, it can make data collection for volume tracking difficult. Along with this limitation, tracking the total volume may also be inefficient if the separated bins do not contain all the plastic used in a day. For instance, plastic cannot be tracked if students litter on school grounds or buy plastic but dispose of it elsewhere. Additionally, SJC may see an increase in recorded plastic use if the usage of the bins increases as the separation system improves. Although this scenario indicates a positive change since more students are following the system, it would be difficult to track the decrease in plastic consumption.

5.1.2 Implement a sustainability curriculum

Educational awareness attracted contradicting data throughout our findings. As discussed in *Finding 2*, education is valuable, but in *Finding 5*, we found that students know of the impacts of plastic. We suggest to educate individuals and promote awareness regarding plastic consumption at a young age to impact their plastic consumption behavior. Educating youth develops awareness of the current issue and gets teachers more involved with the school's goals to reduce plastic. To fully understand if educating youth does have a positive relationship with behavior, we suggest a potential project should investigate and work to analyze the gap between educational awareness and behavioral change. Ideas to incorporate a sustainability curriculum include: art projects with recycled material, voluntary campus or community cleanup competitions, reusable bag design contest for students, campus-wide competition to see which class uses less plastic, a Green Theme sports day, or a Miss Green where SJC faculty recognizes a student for their contribution to the plastic free program.

5.1.3 Introduce alternative and reusable materials

Our background research showed banning or taxing plastic consumption is an effective method for reducing plastic (*Section 2.3.1*). However, data collected from interviews and surveys showed that introducing alternative materials was the most positively received option. There are water filters and a waste separation station implemented in SJC which led us to recommend the reinforcement of alternative materials in the school to promote less plastic consumption. These alternative materials can become useful in canteens, school shops, and in collaboration with vendors outside of SJC. Materials can include, but are not limited to reusable straws, cups, cutlery, bags, and bottles. The school will be able to explore different materials such as bioplastics or biodegradable materials. Using reusable water bottles and bags should be highly encouraged on school grounds for both students and staff. Not only will this recommendation reduce plastic consumption, but it will also reduce plastic litter throughout SJC and further beautify the school grounds. According to our results, individuals will use alternative materials, but they are usually not offered this option, or they are not aware these options exist. For instance, *Finding 6* supports that vendors would be in favor of switching to alternative materials if they were presented to them. Ideally, this recommendation would ease SJC into our next stage: a school-wide ban on single-use plastic.

5.1.4 A school-wide ban on single-use plastic

Our investigation found many programs recommended policy making and banning of plastic within our program. Teacher interviews from *Finding 7* suggest banning could strongly change not only SJC, but also other schools. Although banning was a less popular initiative than introducing reusable materials, this method is still one of the most effective in reducing plastic and cannot be ignored. Therefore, as a next step to introducing alternative and reusable materials, we suggest an official ban or limitation on plastic inside SJC. To lessen the intensity of the school-wide ban, introducing alternative materials will allow the community to ease into a “no plastic” lifestyle. An event that would promote this experience positively is a “No Plastic” Inaugural Party that could be a concert, field day, or sports day. Furthermore, we recommend a bag and bottle share program for students to avoid resorting to plastic on days they forget their

reusable items. Providing the school and community with a goal they can both work toward and stand behind will bring each party closer together while also improving the environment.

5.2 Phase Two: SJC Community

5.2.1 SJC communicates to parents and faculty

Finding 7 suggests involving all community members in our project will reinforce and encourage participation. Therefore, we suggest SJC hold a parent and faculty “No Plastic” orientation before every school year. Sharing information about the plastic reduction program with SJC parents and inviting them to adopt some of the school’s changes in their own home will help students transition into the program. All SJC personnel should make it their mission to uphold the school’s waste management and plastic reduction programs both at school and at home. This recommendation is reliant upon the success of earlier recommendations such as the sustainability curriculum, introduction of alternative materials, and ban on plastic. Recommendations provided to parents and faculty include limiting or banning plastic at home and converting to reusable containers or alternative materials. In addition, we encourage SJC to have parents sign a form agreeing to SJC’s mission to reduce plastic as much as possible. Doing so will not only allow students of parents to be continuously conscientious of plastic consumption in all settings, but also further influence the community by engaging families. Including faculty and their family members in this outreach provides community solidarity and consensus.

5.2.2 Orientation for vendors surrounding SJC

From *Finding 6*, we found vendors have followed policies put in place by SJC before that required them to ban foam products. We believe having orientations for vendors not only reminds them of the strides that SJC students are taking to be plastic free, but also promotes alternative materials for vendors to use within their own stands. We compiled a set of three event ideas to make the vendors a part of this plastic free campaign:

- Suggest to vendors to stop giving out plastic unless asked for by customers
- When SJC vendors come to SJC for events such as “Dok Rak Baan” (Crown flower blossom) activity day, restrict the vendors from using plastic products
- Introduce water filters (1 baht per 1-2 liters) outside of the school on Convent Road

There are limitations with these recommendations. The first is that there may not currently be an alternative to plastic that vendors can use that is economically favorable and is convenient. The second limitation is that introducing water filters outside SJC may not receive positive feedback considering the water filters would take away profits from vendors who currently sell plastic water bottles. From our research and data collection, we have inferred that, for this program to succeed, it is important to build relationships with local businesses and the authorities. From *Finding 3* we recommend that SJC should team with other organizations that will support the plastic free initiative. Also, conducting a bi-annual orientation for vendors to go over the plastic free program can help to promote awareness among them and impact SJC’s surrounding community.

5.3 Phase Three: Continuity

5.3.1 Tracking of plastic use and waste inside the school

To record the ongoing impact of SJC's efforts on the plastic waste problem, we suggest plastic consumption/waste be tracked and analyzed on a monthly basis. The data obtained from long-term tracking will allow SJC to see the tangible impacts of implemented projects and to identify potential adjustments to the overall action plan. To ensure consistency with tracking success of the action plan, we suggest using similar methods outlined in *Recommendation 5.1.1* to ensure consistency. Comparing information collected monthly can determine which methods are most successful within the community and which ones need adjustments. Understanding the strengths and weaknesses of program methods, leads to improvements and future successes as seen throughout our findings in *Objective 1* and our understanding of SWOT analysis. For this reason, we recommend SJC to perform a SWOT analysis on themselves. This analysis provides SJC with opportunities to develop additional plastic reduction methods that cater directly to their community. It may be difficult to identify which method is having the greatest impact if multiple strategies are working in tandem. This limitation can be overcome by implementing each goal separately over a six month or year-long period. Then, each strategy can be evaluated within that specific timeframe to summarize its influence.

5.3.2 Partnering with outside organizations

By partnering with interested organizations, it guarantees continuous support of the initiative which is addressed in *Finding 3*. Because of this, we suggest SJC partners with organizations to influence a positive change. Possible partners include:

- Chulalongkorn University's "Zero Waste"
- Thai Plastic Recycle as a waste management partner
- Plastic Free NIST for collaboration and events
- Ministry of Education for funding
- Trash Hero to manufacture reusable bottles and bags with the SJC logo

5.4 SJC Action Plan for SJAA

Based on our findings and conclusions we have compiled our recommendations into the action plan seen in pages 25-29. This action plan illustrates the three main phases of our recommendations and the nine sub-goals that will help SJC become a "plastic free" campus and sustainable community. The first page of the action plan summarizes its overall intent with the main goal being "to eliminate the consumption and waste of single-use plastics on SJC's campus in addition to reducing single-use plastic consumption in the surrounding community." The plan highlights the purpose of each sub goal within our three primary phases to establish a comprehensive timeline for the completion of each phase. The subsequent pages of our action plan describes the specific recommendations we have set for each goal based on our research findings. Finally, the action plan highlights potential future projects associated with each phase to provide SJAA with additional direction when carrying out the program for years to come. Our overall deliverable, which can be seen in Appendix G.1 includes summary tables of some of our key findings including summaries of the programs we interviewed throughout our research,

strategy synopses and marketing recommendations. This additional information provides SJAA with further insight that can be expanded upon in future projects.

5.5 Conclusion

In Thailand, plastic is commonly used and is hazardous to human health and the environment. SJC can make a difference in future generation's plastic consumption by using a variety of strategies. Through our program director interviews, it became apparent that a singular strategy to reduce plastic is not a plausible solution. In fact, most interviews led us to conclude that several strategies are required to reduce plastic effectively. Our team recommends three phases of focus for plastic reduction in SJC and its community.

First, focusing on the school and targeting plastic consumption systems, introducing alternative materials, gaining faculty support, and implementing education awareness will create an impact. Second, creating awareness in the community outside of the school such as with vendors and parents can provide support in reduction activities. Vendor and parent orientations will attract outside community recognition of the plastic problem and help in spreading awareness. Lastly, our third phase improves and expands introduced initiatives with the school's mission and goals. The expansion means partnering with outside organizations to attain supplementary support and funding. Gaining support from governmental organizations, local business, and communities are key for the program to be successful and efficient. These three phases can help SJC turn into a plastic free community.

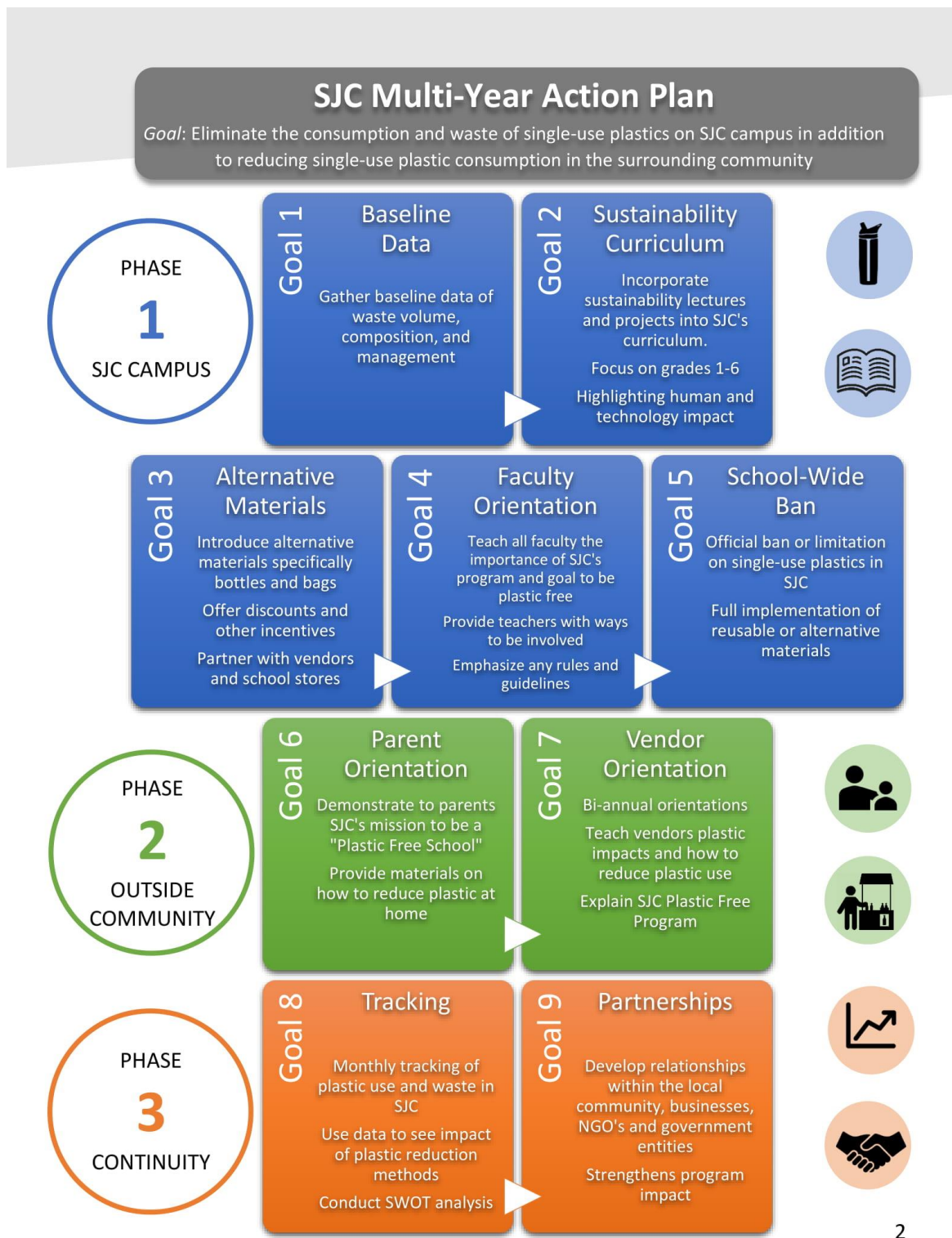


Figure 5.1: SJC's multi-year action plan overview

1 SJC CAMPUS



GOAL 1: BASELINE DATA

This goal will allow SJC to track the school's progress throughout the program.

Recommendations:

1. Track the amount of plastic sold or handed out in SJC's canteens and school stores each day.
2. Document plastic waste by weighing the amount in waste separation containers at the end of each day

GOAL 2: SUSTAINABILITY CURRICULUM

Educating students on the impact of plastic at a young age can promote pro-environmental ideals and actions.

Recommendations:

1. Projects involving recycled material
2. Competitions including designing reusable bags or bottles, and for being the most plastic free classroom
3. Events such as a Green Theme sports day or Miss Green pageant to recognize sustainable students

GOAL 3: ALTERNATIVE MATERIALS

Providing students with alternatives to plastic will make it easier for them to change their plastic consumption habits.

Recommendations:

1. Providing reusable cups, straws, utensils, bags, and bottles to students and staff
2. Offer incentives and discounts for using alternatives to plastic
3. Partner with school stores and vendors to reduce plastic use in their products

GOAL 4: FACULTY ORIENTATION

This goal ensures the understanding and support of important actors in the SJC campus for the plastic reduction initiatives.

Recommendations:

1. Establish criteria all teachers have to follow
2. Hold an assembly to explain all of SJC's goals to reduce plastic use

GOAL 5: SCHOOL-WIDE BAN

A ban would be effective in reducing plastic and unifying the entire campus behind SJC's sustainability goals.

Recommendations:

1. "No Single-Use Plastic" Inaugural Party to kick start the plastic reduction strategy
2. Bag and bottle sharing program if students forget their own reusable items

Figure 5.2: Phase one for SJC's action plan

1 SJC CAMPUS



Future Project Idea #1

Research what marketing techniques are most effective in maximizing student engagement

Future Project Idea #2

Development of effective sustainability curriculum and educational materials

Future Project Idea #3

Research about economically feasible and sustainable alternative materials that are functionally similar to plastic

Future Project Idea #4

Establishment of a reusable bottle and bag sharing program

Figure 5.3: Phase one continued, of SJC's action plan

2 OUTSIDE COMMUNITY



GOAL 6: PARENT ORIENTATION

This goal will strengthen SJC's impact on the community and student's behavior at home.

Recommendations:

1. Hold a "No Plastic" orientation at the beginning of each school year
2. Develop educational material and recommendations for parents on how they can reduce plastic consumption at home

GOAL 7: VENDOR ORIENTATION

This project will target plastic consumption within the community at the source and build community relationships.

Recommendations:

1. Suggest vendors stop giving out plastic with their products unless asked for by customers
2. When vendors come to SJC, such as for Dok Rak Barn activity day, restrict vendors from using plastic while selling their products
3. Install water filters outside of school grounds

Future Project Idea #5

Develop or identify system modifications that can be implemented in the average household (ex: affordable water filter)

Future Project Idea #6

Identify plastic alternatives based on vendor preferences and economic feasibility for material implementation

Figure 5.4: Phase two of SJC's action plan

3 CONTINUITY



GOAL 8: TRACKING

This goal will allow SJC to track the school's progress throughout the program in the future in addition to identify and address weak areas as the program progresses.

Recommendations:

1. Continue monthly tracking efforts conducted throughout Goal 1
2. Complete SJC SWOT Analysis to determine strengths and weaknesses of the program within the SJC community
3. Additional parent and faculty surveys and compare to the data obtained through our research

GOAL 9: PARTNERSHIPS

Partnerships with other organizations will promote the longevity of SJC's efforts in addition to expanding outreach beyond the school community.

Recommendations:

1. Partnerships with a variety of organizations such as governmental, non-governmental, businesses, community based projects and other sustainable schools
 - a. Chulalongkorn University
 - b. Schools in St. Paul of Chartres Network
 - c. Other "To be Number One" Schools
 - d. Ministry of Education
 - e. Bangrak District Office
 - f. Bangkok Metropolitan Administration

Future Project Idea #7

Conduct secondary phase SJC SWOT Analysis and community consumption behavior surveys to determine program areas that need improvement

Future Project Idea #8

Create an integrated action plan with outside partners for spreading plastic reduction efforts throughout Bangkok

Figure 5.5: Phase three of SJC's action plan

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Appendix A.1: SJC Student Surveys

Plastic Behavior and Knowledge Survey



Chulalongkorn University
BSAC จุฬาลงกรณ์มหาวิทยาลัย



This survey's purpose is to determine current Thai knowledge of plastic consumption and waste, and to identifying factors that affect plastic consumption. The completion of this survey is voluntary and your response is anonymous.

จุดประสงค์ของแบบสอบถามนี้คือการเก็บข้อมูลด้านความรู้เกี่ยวกับพลาสติกและขยะพลาสติกของผู้บริโภค เพื่อค้นหาปัจจัยที่ส่งผลกระทบต่อการใช้พลาสติกในปัจจุบัน การทำแบบสอบถามครั้งนี้เป็นไปโดยความสมัครใจ และไม่ต้องการระบุข้อมูลส่วนตัวใดๆทั้งสิ้น

Please fill answer every question that we provide - กรุณาตอบคำถามให้ครบทุกข้อ

1. What is your age? (ช่วงอายุของคุณ)

- ☐ 10-14
- ☐ 15-19
- ☐ 20-24
- ☐ 25+

2. Plastic waste is harmful for the environment (ขยะพลาสติกเป็นอันตรายต่อสิ่งแวดล้อม)

- ☐ Strongly Agree (เห็นด้วยอย่างยิ่ง)
- ☐ Agree (เห็นด้วย)
- ☐ No opinion (ไม่มีความเห็น)
- ☐ Disagree (ไม่เห็นด้วย)
- ☐ Strongly Disagree (ไม่เห็นด้วยอย่างยิ่ง)

3. Plastic waste is bad for human health

(ขยะพลาสติกส่งผลกระทบต่อสุขภาพของมนุษย์)

- ☐ Strongly Agree (เห็นด้วยอย่างยิ่ง)
- ☐ Agree (เห็นด้วย)
- ☐ No opinion (ไม่มีความเห็น)
- ☐ Disagree (ไม่เห็นด้วย)
- ☐ Strongly Disagree (ไม่เห็นด้วยอย่างยิ่ง)

4. Does your school have a program about plastic waste or use?

(โรงเรียนของเรามีการจัดการขยะพลาสติก)

- ☐ Yes and I strictly follow it (มี และฉันปฏิบัติตามอย่างเคร่งครัด)
- ☐ Yes and I sometimes follow it (มี และฉันปฏิบัติตามบ้างบางครั้ง)
- ☐ Yes, but I don't follow it (มี แต่ฉันไม่ได้ปฏิบัติตาม)
- ☐ We don't have a program (โรงเรียนเราไม่มีโครงการเชิงนี้เลย)
- ☐ I am not sure (ฉันไม่แน่ใจ)

5. Where do you most often get plastic?

(คุณได้พลาสติกมาจากแหล่งใดบ่อยที่สุด)

- ☐ Markets/vendors (ตลาด/ร้านค้าแผงลอย)
- ☐ Convenience Store / Supermarket (ร้านสะดวกซื้อ เช่น 7-Eleven/ ซูเปอร์มาร์เก็ต)
- ☐ Shopping Mall (ห้างสรรพสินค้า)
- ☐ Restaurants (ร้านอาหาร)

6. How do you typically disposed of plastic?

(โดยปกติคุณกำจัดขยะพลาสติกอย่างไร)

- ☐ Recycle bin (ถังขยะรีไซเคิล)
- ☐ Just throw away to normal bin (ถังขยะธรรมดา)
- ☐ Sell plastic waste to a collector (ขาย)
- ☐ Not Sure (ไม่แน่ใจ)
- ☐ Other (อื่นๆ โปรดระบุ):

7. How often do you use the recycle bin?

(คุณแยกขยะใส่ถังขยะรีไซเคิลบ่อยแค่ไหน)

- ☐ Never (ไม่เคย)
- ☐ Rarely (นานๆครั้ง)
- ☐ Sometimes (บางครั้ง)
- ☐ Often (บ่อยๆ)
- ☐ Always (เป็นประจำ)

8. If the supermarket at which you normally shop starts charging 5 Baht/plastic bag to put your stuff in, what would you do?

(ถ้าร้านสะดวกซื้อหรือซูเปอร์มาร์เก็ตที่คุณไปใช้บริการเป็นประจำเริ่มเก็บเงิน 5 บาทสำหรับถุงพลาสติกทุกหัวใส่ของ คุณจะทำอย่างไร)

- ☐ pay 5 Baht/bag (จ่ายเงินใบละ 5 บาท)
- ☐ go to another supermarket that doesn't charge for a bag (ไปใช้บริการร้านอื่นที่ไม่เก็บค่าถุง)
- ☐ Buy / bring a reusable bag to put stuff in (ซื้อหรือนำถุงไปเอง)
- ☐ complain publicly via social media & tell others to boycott this supermarket for unacceptable overcharging practice (โพสต์ต่อว่าลงโซเชียลเน็ตเวิร์กเพื่อเตือนมิให้คนอื่น ๆ ต้องมาเสียค่าถุงที่ไม่เป็นธรรม)
- ☐ Other (อื่นๆ โปรดระบุ):

9. What type of plastic would you say you use the most frequently?

(คุณใช้พลาสติกประเภทใดบ่อยมากที่สุด)

☐


Plastic Bag
(ถุงพลาสติก)

☐


Plastic Bottle
(ขวดพลาสติก)

☐


Plastic Straw
(หลอดพลาสติก)

☐


food containers
(พลาสติกบรรจุอาหาร)

☐


Plastic cup
(แก้วพลาสติก)

☐

Other
อื่นๆ (โปรดระบุ)

10. Why do you use the type of plastic that you selected in the previous question?

(จากคำถามก่อนหน้านี้ ทำไมคุณถึงเลือกใช้พลาสติกประเภทดังกล่าว)

- ☐ It is convenient (สะดวกสบาย)
- ☐ It is sanitary (สะอาดถูกสุขอนามัย)
- ☐ It is light weight (น้ำหนักเบา)
- ☐ The store or restaurant gives it to me (ร้านค้า หรือ ร้านอาหารให้มา)
- ☐ There is no alternative (ไม่มีทางเลือกอื่น)
- ☐ Other (อื่นๆ โปรดระบุ): _____

11. Do you use any of the following on a daily basis? (Choose all that apply)

(คุณใช้อะไรบ้าง เลือกได้มากกว่า 1 ข้อ)

- ☐ tote bag (ถุงผ้า)
- ☐ reusable water bottle (ขวดหรือแก้วที่สามารถใช้ซ้ำได้)
- ☐ water filter (ตู้กรองน้ำ)
- ☐ I do not use any of the above options (ฉันไม่ใช้อะไรที่กล่าวมาข้างต้นเลย)

12. Why or why do you not use any of the options from question 11?

(ทำไมคุณถึงใช้หรือไม่ใช้ตัวเลือกดังกล่าวในข้อ 11)

13. What would make it easier for you to minimize your own plastic use/waste?

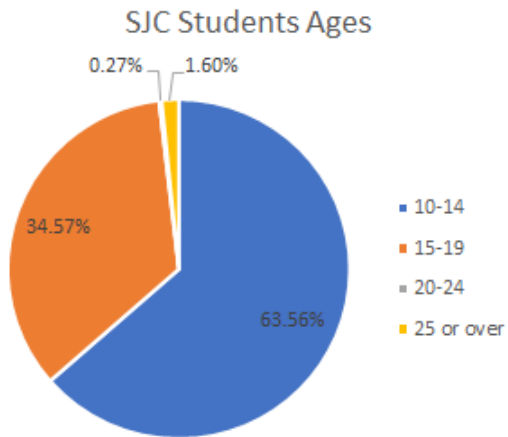
(การระบุปัจจัยที่จะช่วยให้ท่านลดการใช้พลาสติกลงได้)

Thank you for taking time to complete this survey, your participation will help our research move forward!

ขอบคุณที่ให้ความร่วมมือเพื่อทำแบบสำรวจนี้ ข้อมูลของท่านจะช่วยให้เราวางแผนการรณรงค์ต่อไป

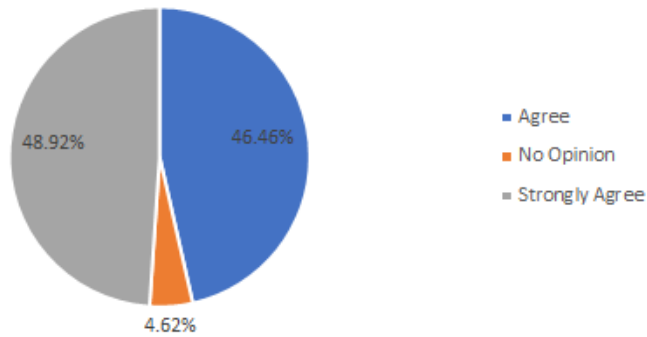
Appendix A.2: SJC Student Response

Question 1.



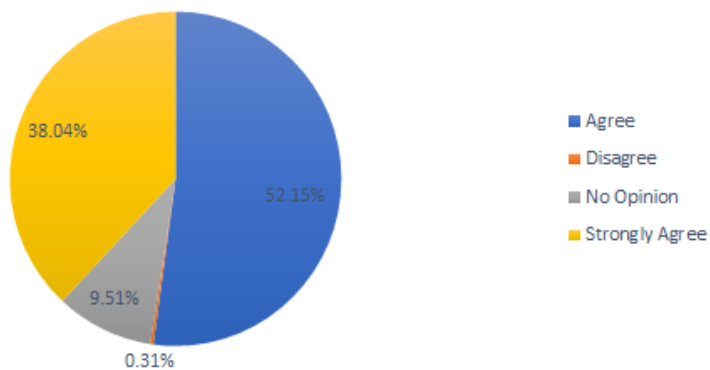
Question 2.

SJC responses to: Plastic Waste is Harmful for the Environment



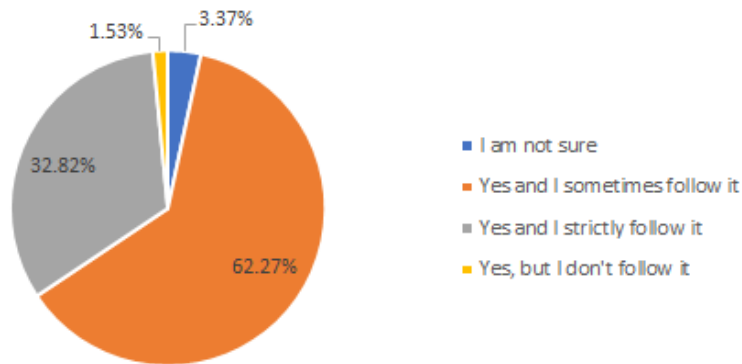
Question 3.

SJC Student Responses to: Plastic Waste is bad for Human Health



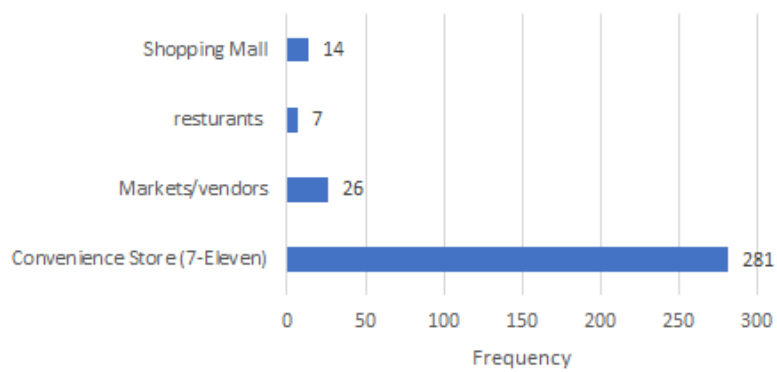
Question 4.

SJC Student Responses to: Does SJC have a program about plastic waste or use?



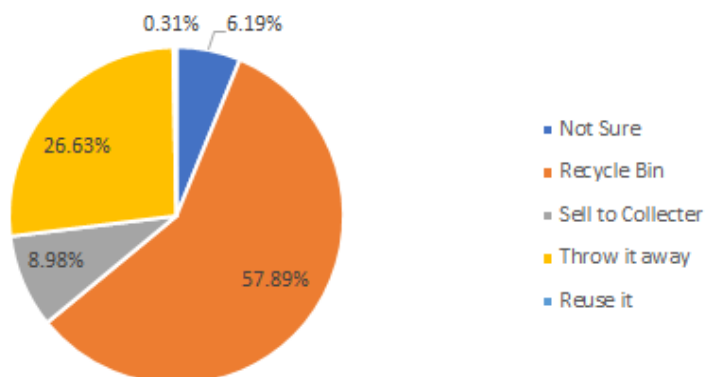
Question 5.

Frequency of where SJC students said receive plastic most



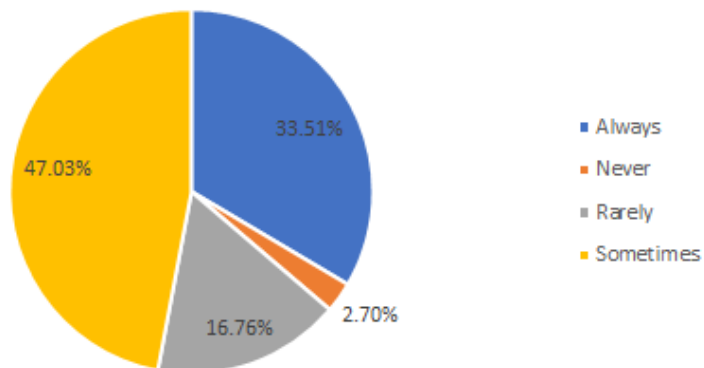
Question 6.

SJC Student Responses to How they Dispose of Plastic



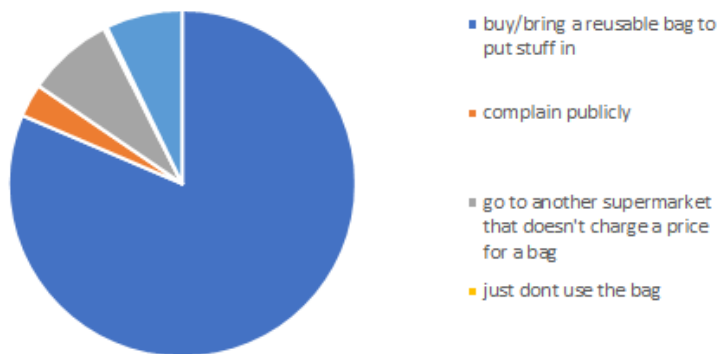
Question 7.

SJC Responses to How Frequently they Recycle



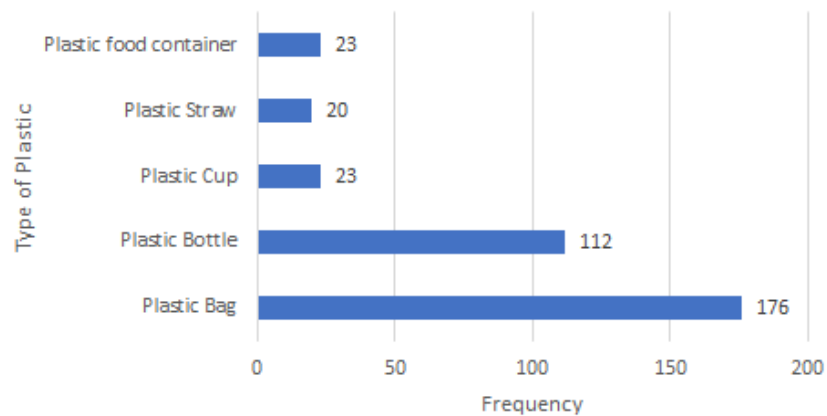
Question 8.

SJC Student's Responses to What they Would do if a Store Charged them 5 Baht for a Plastic bag

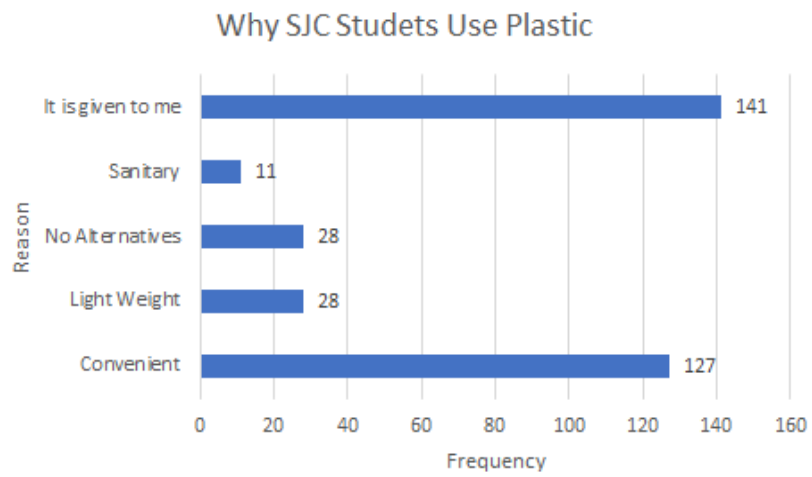


Question 9.

Type of Plastic SJC Students Use Most



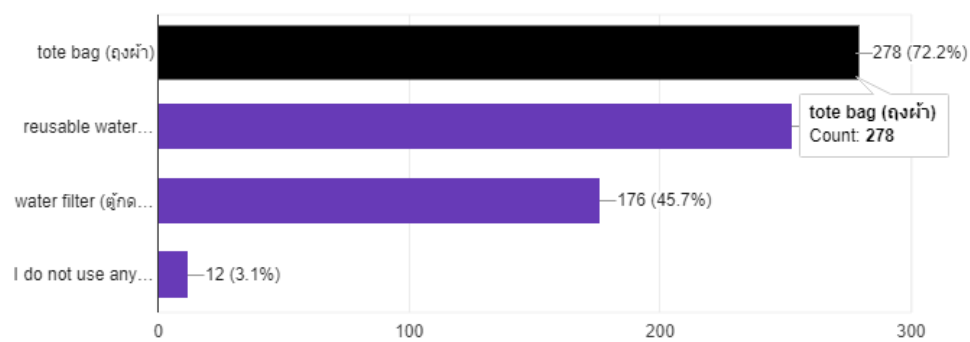
Question 10.



Question 11.

11. Do you use any of the following on a daily basis? (choose all that apply)

385 responses



Appendix B.1: SJC Parent Surveys

Plastic Behavior and Knowledge Survey



This survey's purpose is to determine current Thai knowledge of plastic consumption and waste, and to identifying factors that affect plastic consumption. The completion of this survey is voluntary and your response is anonymous. จุดประสงค์ของแบบสอบถามนี้คือการเก็บข้อมูลด้านความรู้เกี่ยวกับพลาสติกและขยะพลาสติกของผู้บริโภค เพื่อค้นหาปัจจัยที่ส่งผลกระทบการใช้พลาสติกในปัจจุบัน การทำแบบสอบถามครั้งนี้เป็นไปโดยความสมัครใจ และไม่ต้องระบุข้อมูลส่วนตัวใดๆทั้งสิ้น

Please fill answer every question that we provide - กรุณาตอบคำถามให้ครบทุกข้อ

1. Would you take steps to make your home plastic free?

(คุณสนใจที่จะเปลี่ยนให้บ้านของคุณให้ปราศพลาสติกหรือไม่?)

- ☐ Yes (สนใจ)
- ☐ Maybe (อาจสนใจ)
- ☐ No (ไม่สนใจ)

2. What would help you reduce your plastic use at home?

(กรุณาระบุปัจจัยที่จะช่วยให้คุณลดการใช้พลาสติกที่บ้านลงได้)

3. What type of approach would be most influential for you to change your habits?

(ท่านคิดว่าข้อใดมีอิทธิพลต่อการเปลี่ยนแปลงพฤติกรรมเกี่ยวกับการใช้พลาสติกมากที่สุด)

- ☐ Educational awareness (มีความรู้เชิงลึกเกี่ยวกับพลาสติก)
- ☐ Banning or taxing plastic (รัฐห้ามใช้ หรือ เก็บภาษีพลาสติก)
- ☐ Introducing an alternative material (มีวัสดุทางเลือกทดแทน)
- ☐ An incentive program (โครงการที่สร้างแรงจูงใจ)
- ☐ Waste separation program or recycling program (โครงการแยกขยะหรือโครงการรีไซเคิล)
- ☐ Other (อื่นๆ)

4. If SJC introduced a plastic program for SJC families to follow, would you follow it?

(ถ้าโรงเรียนเซนต์โยเซฟคอนเวนต์จะเริ่มรณรงค์เรื่องการใช้พลาสติกทั้งที่โรงเรียนและที่บ้าน ท่านจะร่วมมือหรือไม่?)

- ☐ Yes (ร่วมมือแน่นอน)
- ☐ Maybe (อาจให้ความร่วมมือ)
- ☐ No (ไม่ร่วมมือ)

5. What type of single-use plastic do you use most frequently each day?

(พลาสติกแบบใดที่คุณใช้แล้วทิ้งมากที่สุดในแต่ละวัน)

6. Do you use a water filter at home?(คุณใช้ตู้กรองน้ำหรือเครื่องกรองน้ำที่บ้านของคุณหรือไม่)

- ☐ Yes (ใช่)
- ☐ No (ไม่ใช่)
- ☐ Sometimes (ใช้บ้าง)

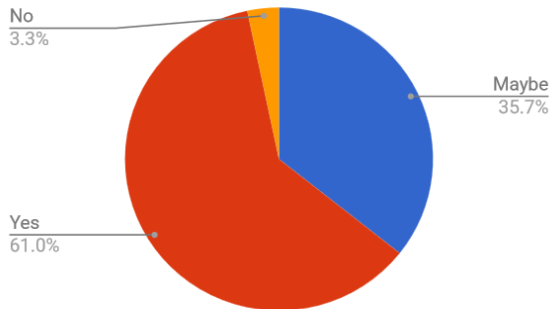
Thank you for taking time to complete this survey, your participation will help our research move forward!

ขอบคุณที่ให้ความร่วมมือเพื่อทำแบบสำรวจนี้ ข้อมูลของท่านจะช่วยให้เราวางแผนการรณรงค์ต่อไป

Appendix B.2: SJC Parent Responses

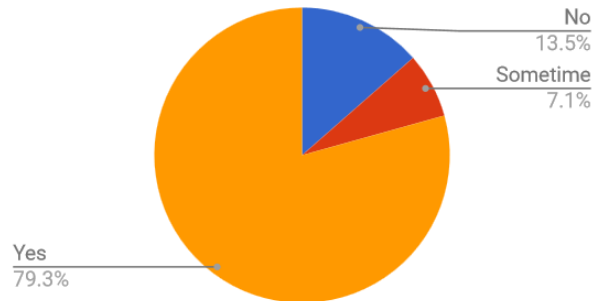
Question 1:

Would you take steps to make your home plastic free?



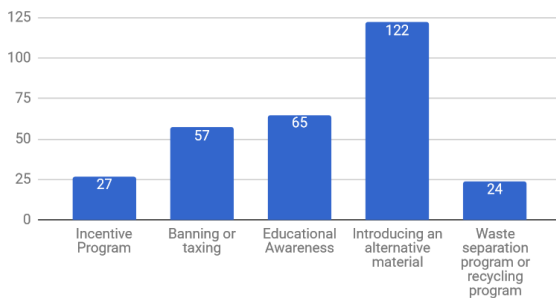
Question 6:

Do you use a water filter at home?



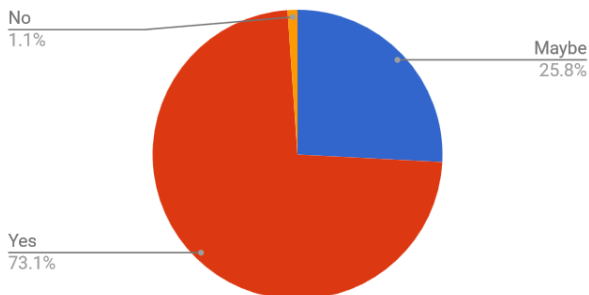
Question 3:

What type of approach would be most influential for you to change your habits?



Question 4:

If SJC introduced a plastic program for SJC families to follow, would you follow it?



Appendix C.1: Vendors Survey

1. Why does your stand use plastic?
2. If there have other materials, will you willing to use instead of plastic?

Appendix C.2: Vendors Survey Analysis

Banana Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none">• Familiarity• Convenient
Reality of changing	<ul style="list-style-type: none">• If plastic is not an option• If a regulation was in place

Toy Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none">• Convenient• Customer's demand
Reality of changing	<ul style="list-style-type: none">• If economically favorable

Flower Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none">• Convenient• Good with product
Reality of changing	<ul style="list-style-type: none">• If economically favorable

Drink Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none">• Trend• Customer's demand
Reality of changing	<ul style="list-style-type: none">• If competition also changed

Corn Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> ● Familiarity ● Good with product ● Customer's demand
Reality of changing	<ul style="list-style-type: none"> ● If alternative is good as plastic

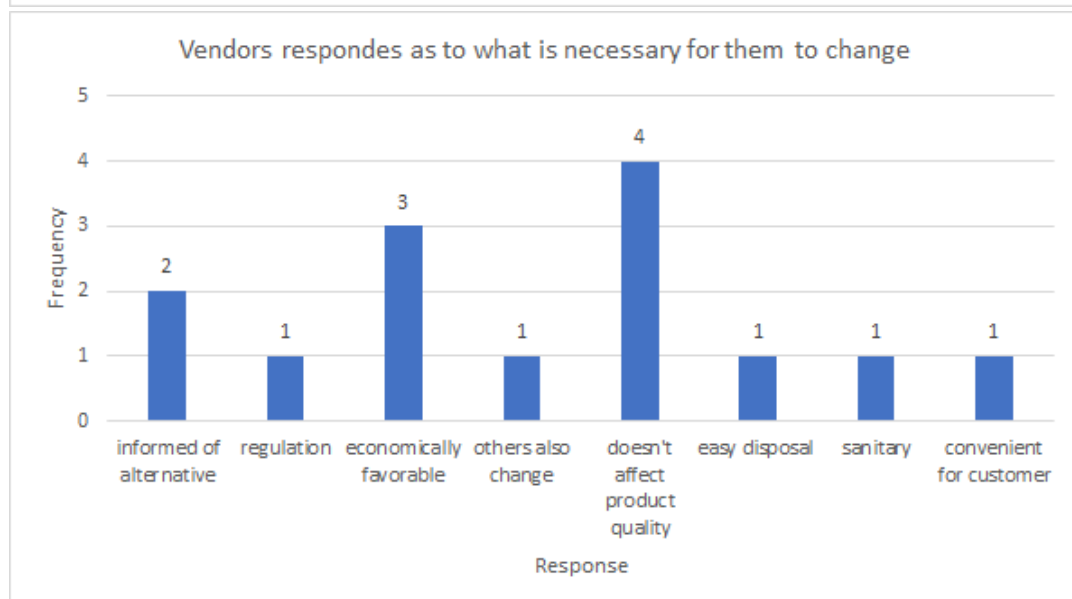
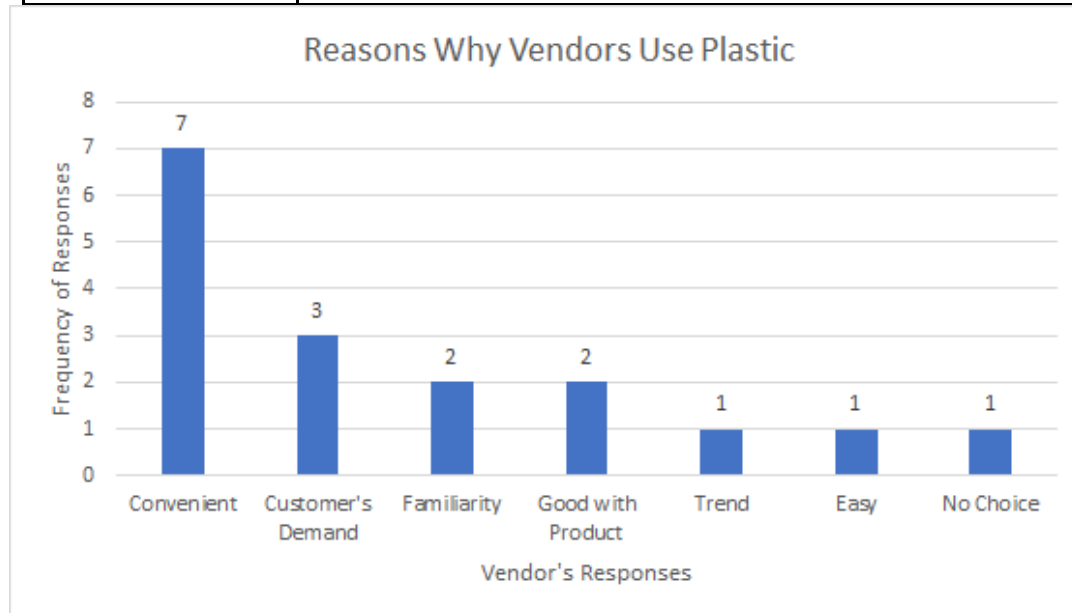
Grill pork Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> ● Easy ● Convenient
Reality of changing	<ul style="list-style-type: none"> ● if economically favorable ● if doesn't affect quality of product

Street snack Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> ● Convenient
Reality of changing	<ul style="list-style-type: none"> ● Would change because hard to recycle

Fruit 1 Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> ● No choice
Reality of changing	<ul style="list-style-type: none"> ● if presented with an alternative material

Fruit 2 Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> ● Convenient
Reality of changing	<ul style="list-style-type: none"> ● If it's sanitary ● If transparent ● If good material

Bread Vendor	Final Framework
Reasoning of use	<ul style="list-style-type: none"> Convenient I used to foam before I use plastic ,but when SJC bans using foam, I use plastic instead
Reality of changing	<ul style="list-style-type: none"> If it's convenient for customer If it have no unexpected smell.



Appendix C.3: Observations Along Convent Road



Fruit packaged in plastic



Corn packaged in plastic



Purses and shoes packaged in plastic



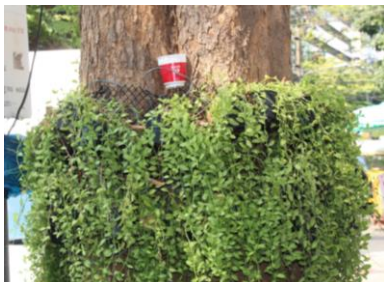
Customers drinking out of plastic straws



Plastic products seen in the bush



Plastic straws hanging



Plastic coffee cup seen stuck in a tree

Appendix D.1: SJAA Survey

1. What is your age?

- ☐ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50+

2. Would you be willing to help SJC become a plastic free school?

- ☐ Yes
- ☐ Maybe
- ☐ No

3. How do you think SJAA could help SJC to reduce students plastic use?

4. How do you think SJAA could work with the vendors along the SJC street to reduce their plastic use?

5. What other areas around SJC do you think SJAA could influence/work with to use less plastic?

6. Have you heard of any schools or programs that are successful at reducing plastic waste/consumption?
If so please elaborate.

7. What would make it easier for you to minimize your own plastic use/waste?

8. If the supermarket you shop at starts to charge 5 Baht/plastic bag to put your stuff in, what would you do?

- ☐ pay the 5 baht
- ☐ go to another supermarket that doesn't charge for a bag
- ☐ go buy a reusable bag to put stuff in
- ☐ complain publicly via social media and tell others to boycott this supermarket for unacceptable overcharging practice
- ☐ Other _____

9. Which strategy do you think would be beneficial to use in SJC to reduce plastic use within the school?
(choose all that apply)

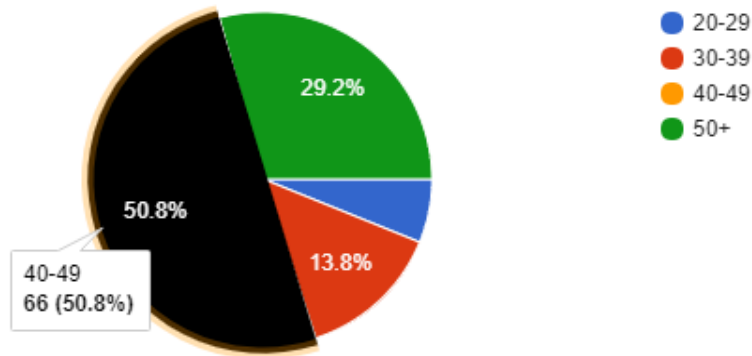
- ☐ Educational awareness
- ☐ Banning or taxing plastic within the school
- ☐ Introducing alternative materials
- ☐ An incentive program
- ☐ Waste separation program or a recycling program
- ☐ Other _____

Appendix D.2: SJAA Survey Responses

Question 1.

What is your age? (ช่วงอายุของคุณ)

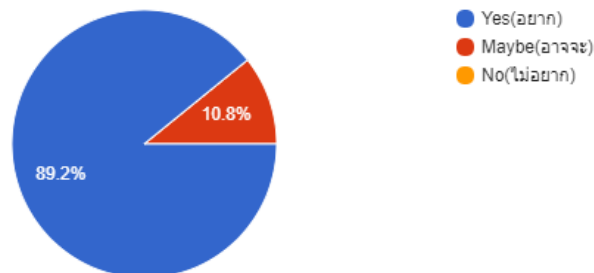
130 responses



Question 2:

Would you be willing to help SJC become a plastic free school?(คุณอยากรจะช่วยให้โรงเรียนเซนต์...เป็นโรงเรียนที่ปราศจากพลาสติกหรือไม่)

130 responses



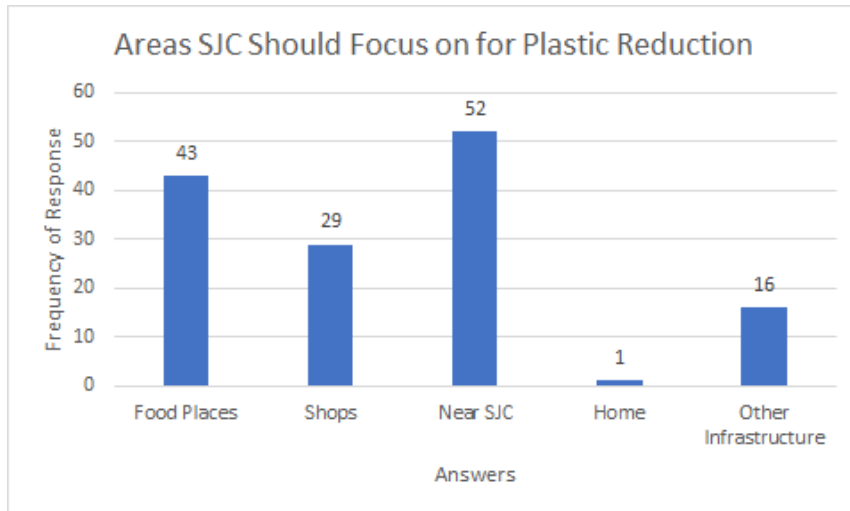
Question 3 Common/Insightful Responses

- Use Natural Materials
- Tiffin Box/Cloth Bag/Containers that aren't single-use
- Redeem points or cash for not using plastic
- Activity to have students pick up trash around Convent Road
- Run Recycle campaign both at school and home
- Plastic free policy starting with school
- Sell or give free alternatives ex. Water bottles and cloth bags
- Joint participation- vendors, students, teachers, home
- Rent for vendors decrease if they use eco-friendly materials
- Miss. Green Contest
- Make a campaign for 5 baht discounts if refuse to use a plastic bag or 5 points accumulated.
Collecting 100 points= reward

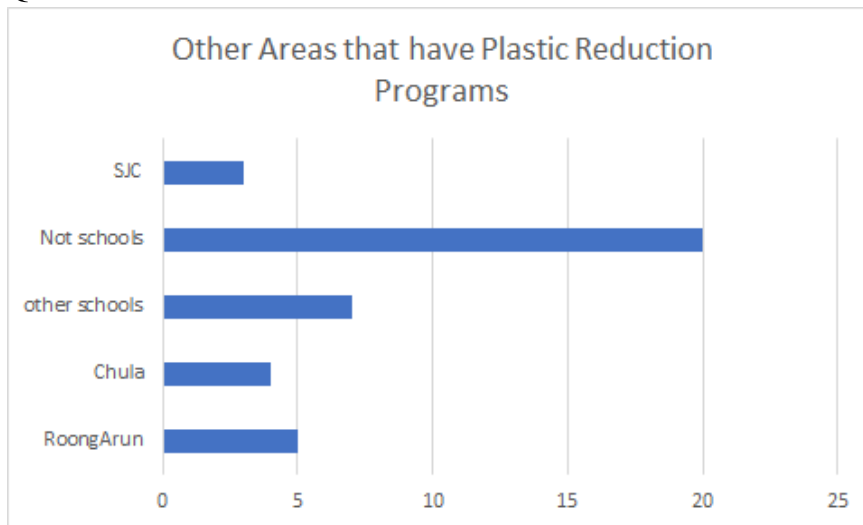
Question 4 Common/Insightful Responses

- Have alternative materials
- Support discounts
- Participate in public campaign with vendors
- Encourage students to not use single-use plastic containers
- Reusable box discount/share
- Educate them

Question 5



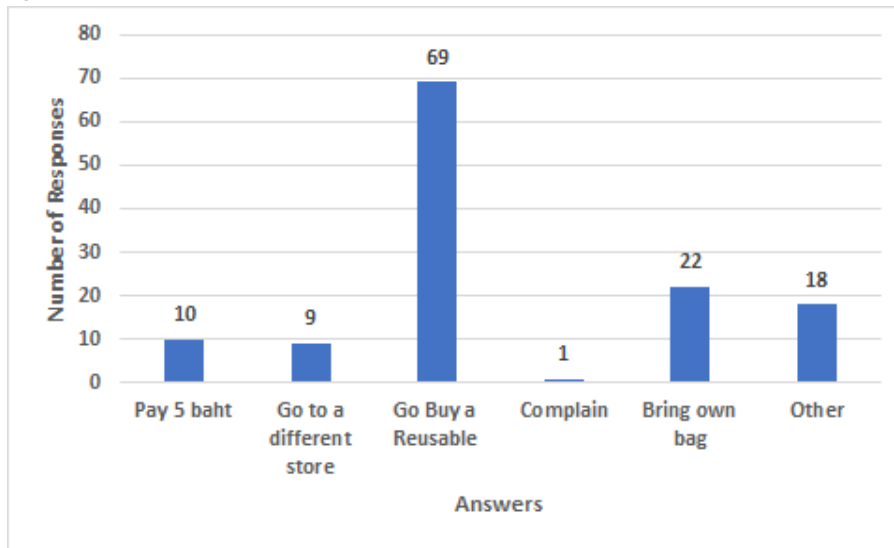
Question 6



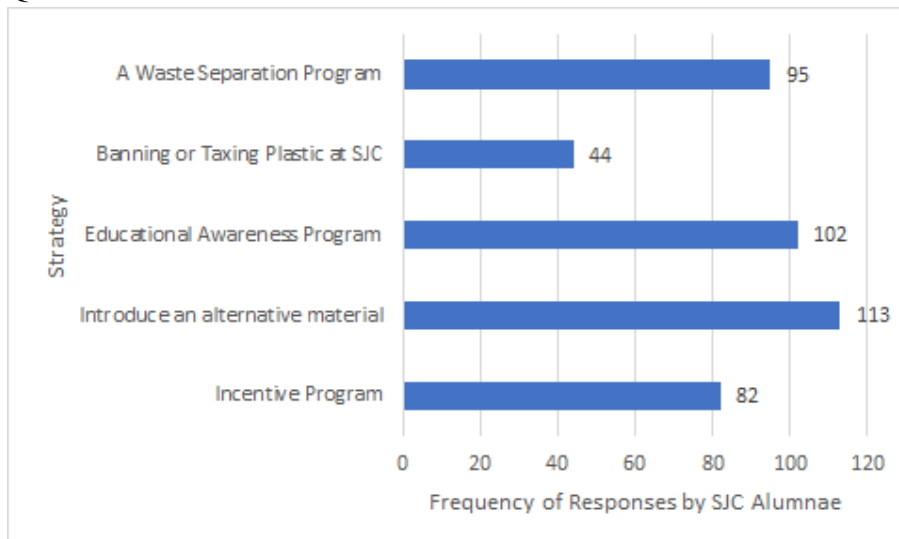
Question 7 Common/Insightful Responses

- Bring cloth bag/reusable container
- Have more awareness/conscious reasoning
- Have petitions to change
- Pay for plastic

Question 8



Question 9



Appendix E.1: SJC Faculty Interview Questions

Use (All Faculty and Administration were asked use questions)

1. Why do you think plastic is frequently used in Thailand?
2. What type of plastic is used most frequently throughout the school and why do you think that is used most frequently?
3. Where do you think plastic is used most frequently in the school?

Teacher Questions

4. Are the students educated about the environmental consequences of plastic?
5. How would you feel about introducing environmental awareness to the curriculum if it's not already?
6. How does the school dispose of plastic?
7. Do students seem to use the waste separation stations and water filters?
8. What do you think is the best way to reduce plastic in the school? Why?
9. How do you think the students and faculty would respond to introducing a substitute material for plastics?
10. How would the students and faculty feel if plastic was banned from SJC?
11. What recommendations would you give to the school to become plastic free? Events, initiatives?

Canteen Questions

1. Would you be willing to use plastic alternatives in your canteen such as reusable or paper straws?
2. Does SJC have any water filters that can be used?
3. Would you be willing to have a waste separation system in the canteen?
4. What recommendations would you give to the school to become plastic free? Events, initiatives?

Custodial Questions

1. What is the most frequent method of disposal for plastic in SJC?
2. Does SJC separate waste?
3. How would you feel about a zero waste system being implemented in SJC?
4. What recommendations would you give to the school to become plastic free? Events, initiatives?

Director Questions

1. What do you think is the best way to reduce plastic in the school? Why?
2. How do you think the students and faculty would respond to introducing a substitute material for plastics?
3. How would the students and faculty feel if plastic was banned from SJC?
4. What recommendations would you give to the school to become plastic free? Events, initiatives?
5. What strengths does your school have?
6. What are the weaknesses of your school?
7. Where do you see a potential for improvement in the future?
8. What are some obstacles that you see your program facing in the future?

Appendix E.2: SJC Faculty Interview Analysis

Theme/Idea	Ms. Wanda*	Mr Bob*	Ms Sue*	Ms Tracy*	Thai Teachers	GENERAL	Interesting:	
Current Use/Mindsets	-convenient -“One finger rule”	-not sure why used -don't think about using plastic and it is not a concern to people -doesn't affect their day to day life -impolite to drink without a straw	-convenient and cheap	-cheap, convenient and waterproof	-Convenient -Foam + warm Food=cancer -School encourages students to bring reusable cups for water filters	-convenient + cheap -one finger rule -waterproof -encouraging students to use reusable cups for waterfilters	<ul style="list-style-type: none"> - The school has an environmental club, but it seems teachers are not aware of these - The school does only allows plastic cups on floor 1, encourages students to bring their own cup for waterfilters - HE and Science are the only ones talking about the theme but barely - The canteen went from using reusable cups to single used plastic cups -Government provides milk in Plastic bottles 	
Systems for Improvement	-buy drinks from canteen -food from canteen	-7-eleven bags everything -plastic bottles at canteen -classrooms have one bin -older kids do not use reusable bottles -from outside and brought in	-drinks/refreshments from the canteen -only 1st floor has waste separation bins	-should come from parents -school only has a limited impact on students behaviors -will depend on each individual family and how much they will cooperate with SJC	-Canteen and shops	-Drinks and food from Canteen -Separation bins only on 1st floor -Parents -Outside factors		
Plastic Type	-bags, cups, bottles, straws -not plastic water bottles-- other drinks	-plastic bottle -government provided milk -snacks from home	-plastic cups	-plastic bags because easy to carry heavy things -food containers for lunch	-Cups -Bags -Snacks	-Bags -Cups -Bottles -Milk (Government) -Food packages		
Educational Knowledge	-taught in health and science classes -teach them how to separate waste -projects around recycling plastic seem to have a positive impact and effect. Projects that challenge and excite students motivate them	-know they are educated -not as much emphasis on consequences as other countries -more awareness=better -start at first grade	-environmental consequences are integrated in their lessons -It's part of the curriculum EP and TP	-in 6th grade taught about saving the world -environmental effects on plastic -educating all in a consistent way throughout the school would be a good idea	-“Pillar/Council of Environmental Conserve activity” Club -students teaching other students about environmental things -HE and Science departments teach impacts of plastics but just an overview	-The educate about plastics and their impacts on the environment -Educate to separate waste -Consistant education is needed -Recycling projects -HE and Science deatpment teach an overview -Environmental club (teaches others about environmental problems - plastics included)		
Disposal	-taught how to separate and dispose of waste	-separation bins are correctly used and recycled	-separation bins -Thai teachers have more influence	-students are good at separating, but not exactly sure how good -school sells waste to collectors	-waste separation -plastic bottle collectors -No plastic reuse program -Bangkok Metropolitan Administration disposes of plastic	-Waste separation -Waste sold to waste collectors -No plastic reuse program -Bangkok Metropolitan Administration disposes of plastic		
Alternative	-lunch boxes can teach them responsibility -initially may be challenging, but will cooperate -reusable cups/bottles and get discounts if use those instead of plastic	-reusable bag to use outside of school ground	-Some may react negatively -It should be normal (part of the picture?)	-biodegradable bags -supermarket reusable bags that you get discounts	-school requests shop to reduce snacks in plastic bag -alternative has to be: cheap, easy to find and use, should be attractive	-Lunch boxes -challenging -Needs to be: cheap, easy to use and find, be appealing -biodegradable -reusable bags		
Banning	-cannot be first step. -have to ease into the ban	-may be a shock if abruptly implemented	-good idea, for the environment -SJC to be an example to others	-if educate them about the ban do not think it will affect them that much -after they are educated, they understand more	-There has to be alternatives with similar properties -It is a possibility	-Not immediately -Good idea,possible -SJC being a leader -If they understand, they will accept it		
Recommendations	-canteen and students to not use plastic if does not need to be -students use own containers	-separation bins in classrooms -reusable bags for outside school -Parent initiative of plastic program but not as extreme as Roong Aroon.	-ask students for ideas -Generate questions for students to find a solution -Parents have great influence -Create things out of plastic -Incentive programs, extra points -Make Sub-leaders to spread awareness	-must go to higher authority to get recommendations -what sisters and director says goes	-Training to for creative ideas -more degradable alternatives -GREEN SCHOOL: natural based utensils (all kinds)	-Students using reusable containers for food -Separation bins in classrooms -Reusable bags to bring things from the outside -Parents influentgreatly in anything done st the school -GREEN SCHOOL (all natural utensils) -Higher authority must approve=what sisters & director say goes -Ask students for ideas -Incentive program (extra points for not using plastic) -Creater project		

Appendix F.1: Program SWOT Interview Questions

Program Name _____

Interviewee's Name _____

- 1. Please give a brief overview of your program and why the program was created**
- 2. What method(s) are utilized to spread awareness of your program? Marketing, outreach, community involvement, etc.**
- 3. How much funding does your program require? Where is this funding received?**

Strengths

- 4. What strengths does your program have?**
- 5. What are some notable achievements of your program?**

Weaknesses

- 6. What are the weaknesses of your program?**
- 7. What would you have done differently in your program?**

Opportunities

- 8. Where do you see a potential for improvement in the future?**
- 9. What impact do you see your program having as it continues?**

Threats

- 10. What are the limitations of your program?**
- 11. What are some obstacles that you see your program facing in the future?**

Final Questions

- 12. Are there any recommendations you would give to a new program director? Where/how to start? What to take in mind?**
- 13. If you could say there is one thing that needs to be changed in order to reduce plastic what would it be?**

Appendix F.2: Program SWOT Interview Analysis

	<u>Chula Zero Waste</u>	<u>Trash Hero</u>	<u>Thai Plastic Recycling</u>	<u>Roong Aroon</u>	<u>NIST</u>	<u>Rereef</u>	<u>Can Do Team</u>
Strengths	Comprehensive Integrated Business Cooperation Incentives Improve Infrastructure Change Behavior Waste Separation	People based Volunteer based Not money driven National recognition Simple and straightforward Performance and education based Help poorer communities	Following the law High technology Environmental friendly Trust among staff Loyal and hardworking	Individual responsibility Setting mindset from young age Sustainability Reduce waste	Vivid case study Surrounded by good listener People know sustainable systems Funding support group Strong communication skills Easy to communicate in group Connection in school community	Have research and information International topic Public awareness Connected to many stakeholders	Contacts Resources Trust within the community
Weaknesses	Ineffective Advertisements People Don't Care Wastes Time and Energy Lack Active Involvement Difficulties Changing Behavior	Lack of participation/attention Don't have good recycling/upcycling Education doesn't change people	Need of more people Language barrier Family should only work on management	Laziness A lot of work inconvenient	Lack of credibility due to age Unbalance work distribution Cultural barrier Unchangeable people	No funding Personal interest is needed for success Limited resources for reaching large amt of people Need to continue focus on not just awareness but also solutions Emphasize more that anyone can make a change	Too broad Not taken seriously Miss-understanding Rejection Too big of a mission No social impact measurement Few local volunteers
Opportunities	Focus on Young/New People Improve PR Methods Encourage Engagement Raise Awareness	Better recycling process Educate about the issue Make change in younger people because future ambassadors and easier to change way	More investors to make the recycling business grow	Decreasing steps (make it easier) Commercialization	Further reduce plastic straw Outside of NIST event(s) Connection with food vendors Toward sustainable market	Gain more participation Change defaults Raise awareness by spreading to new areas Could potentially start a movement	Problem being tackled in the long term Hope in volunteering Community continuing initiative
Threats	Lack of Program Awareness Disengaged Target Audience	Worry about getting participation/ gaining awareness Language barrier Not changing Thai ways Loss of motivation because change is not happening with the root cause Feels lonely	Only recycle plastic bottles New generations don't want to have a waste business	Not enough time to clean Too much waste Lack of alternatives (chip's packages) Difficulties creating anti-plastic campaign	Number of team members Time limitation Incomplete knowledge People's nature Lack of continuity	Economic constraints Few partners for support	No help from government Solidifying an idea + methods Difficult to change people's habits Working with local sponsors
Recommendations	Focus on Changing Businesses Consumers Ineffective	Have a support system Don't be scared of failure Don't get discouraged Focus on single-use Set regulations Have all sectors come together and find a solution	No incentive program Cultivate consciousness Do active activity Target people's mindset	Innovative ways (technology based) Increase awareness More social media involvement	Pinpoint the problems Plastic free and normally function system Analysis of problems and solution 5W 1 H questions State your goal to people Connections and influence	Clear definition of goal Identify change influencers Gain public support Have regulations Good awareness of problem and solution Need to focus on all sectors not just on one	Government support Make it a rule Connections Campaigning does not change habits

Appendix F.3 Program Strategy Summary

Strategies Summary			
Method	Pros	Cons	Occurrence
Incentives	Appeals to personal benefits Encourages participation	Lack of continuity Difficult to track success	6
Bag Charging	Has been successful in reducing consumption Generates funding for other projects	Results in public disagreement	1
Waste Separation	Increases recycling	Lack of proper system use and understanding	5
Changing Default	Opportunity to deny plastic item	Message not clear to customers	2
Education	Spread awareness on the issue	Lack of follow through results in little impact	7
Changing Behavior	Long-term impact	Difficult and ineffective	5
Business Cooperation	Larger impact in community	Difficult to follow up with	5
Reusable Items/Alternatives	Alternatives to plastic Selling items can generate funding for other projects	Higher initial cost Seen as less convenient	4
Community Involvement	Engages more stakeholders Allows for larger changes	Lack of continuity and participation	4
Reuse and Recycle	Reduces plastic litter	Does not reduce consumption	3

Appendix G.1 Full Deliverable

The documents below outline our action plan and provide summaries of related information that can aid our sponsor in future plastic reduction projects.



Guideline to Becoming a Plastic Free SJC

Steps and Recommendations for the St. Joseph's
Alumnae Association of Saint Joseph Convent.

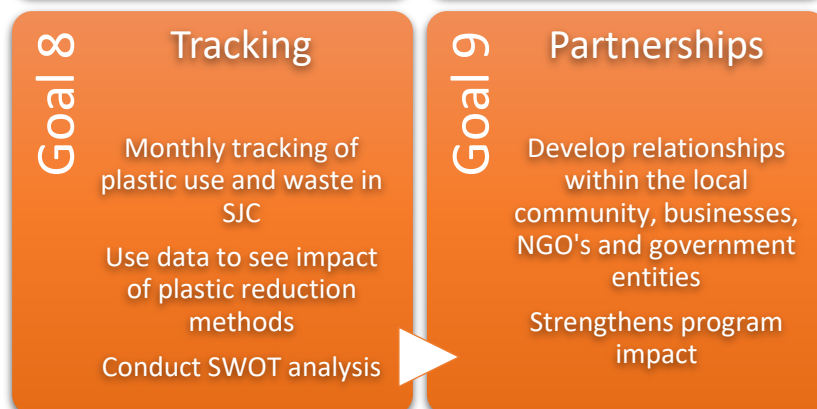
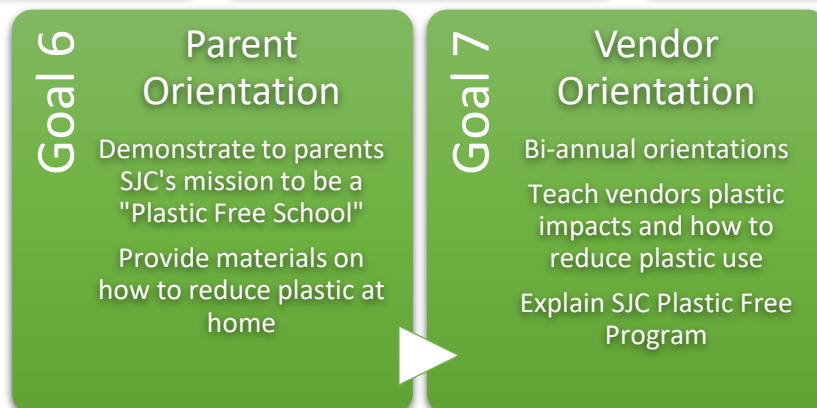
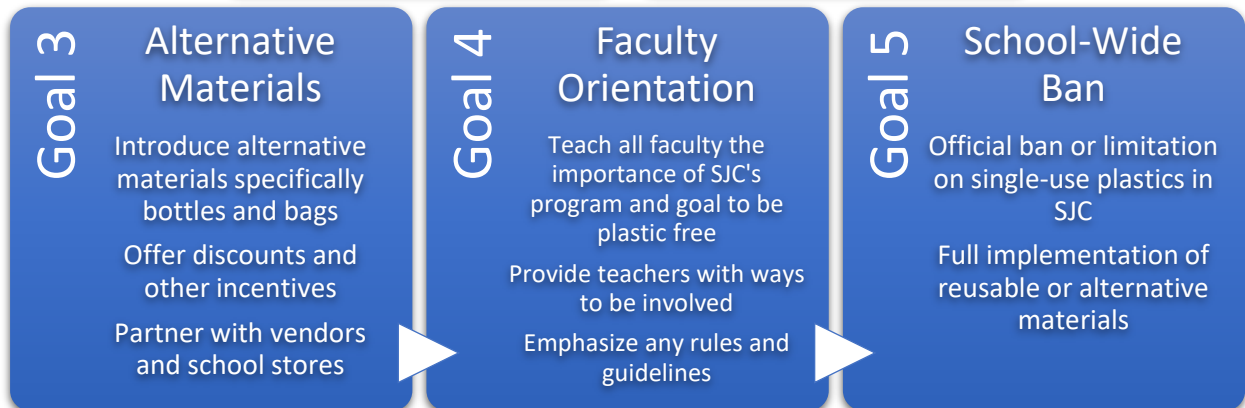
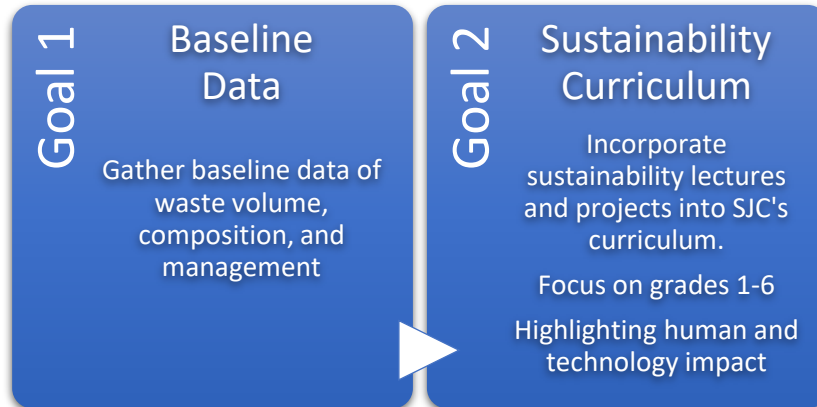
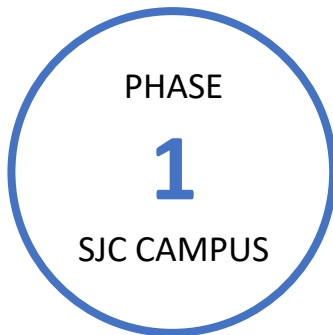
Developed in collaboration between Worcester Polytechnic Institute and Chulalongkorn University.

Table of Contents

Action Plan Overview	2
Phase One Details	3
Phase One Future Projects	4
Phase Two Details	5
Phase Two Future Projects	5
Phase Three Details	6
Phase Three Future Projects	6
Strategy Guidelines	7
Strategy Pros and Cons	11
Partnership Information	12
Partnership Guidelines	18
Marketing Strategies	19
SWOT Analysis	20

SJC Multi-Year Action Plan

Goal: Eliminate the consumption and waste of single-use plastics on SJC campus in addition to reducing single-use plastic consumption in the surrounding community





GOAL 1: BASELINE DATA

This goal will allow SJC to track the school's progress throughout the program.

Recommendations:

1. Track the amount of plastic sold or handed out in SJC's canteens and school stores each day.
 2. Document plastic waste by weighing the amount in waste separation containers at the end of each day
-

GOAL 2: SUSTAINABILITY CURRICULUM

Educating students on the impact of plastic at a young age can promote pro-environmental ideals and actions.

Recommendations:

1. Projects involving recycled material
 2. Competitions including designing reusable bags or bottles, and for being the most plastic free classroom
 3. Events such as a Green Theme sports day or Miss Green pageant to recognize sustainable students
-

GOAL 3: ALTERNATIVE MATERIALS

Providing students with alternatives to plastic will make it easier for them to change their plastic consumption habits.

Recommendations:

1. Providing reusable cups, straws, utensils, bags, and bottles to students and staff
 2. Offer incentives and discounts for using alternatives to plastic
 3. Partner with school stores and vendors to reduce plastic use in their products
-

GOAL 4: FACULTY ORIENTATION

This goal ensures the understanding and support of important actors in the SJC campus for the plastic reduction initiatives.

Recommendations:

1. Establish criteria all teachers have to follow
 2. Hold an assembly to explain all of SJC's goals to reduce plastic use
-

GOAL 5: SCHOOL-WIDE BAN

A ban would be effective in reducing plastic and unifying the entire campus behind SJC's sustainability goals.

Recommendations:

1. "No Single-Use Plastic" Inaugural Party to kick start the plastic reduction strategy
2. Bag and bottle sharing program if students forget their own reusable items

1 SJC CAMPUS



Future Project Idea #1

Research what marketing techniques are most effective in maximizing student engagement

Future Project Idea #2

Development of effective sustainability curriculum and educational materials

Future Project Idea #3

Research about economically feasible and sustainable alternative materials that are functionally similar to plastic

Future Project Idea #4

Establishment of a reusable bottle and bag sharing program

2 OUTSIDE COMMUNITY



GOAL 6: PARENT ORIENTATION

This goal will strengthen SJC's impact on the community and student's behavior at home.

Recommendations:

1. Hold a "No Plastic" orientation at the beginning of each school year
2. Develop educational material and recommendations for parents on how they can reduce plastic consumption at home

GOAL 7: VENDOR ORIENTATION

This project will target plastic consumption within the community at the source and build community relationships.

Recommendations:

1. Suggest vendors stop giving out plastic with their products unless asked for by customers
2. When vendors come to SJC, such as for Dok Rak Barn activity day, restrict vendors from using plastic while selling their products
3. Install water filters outside of school grounds

Future Project Idea #5

Develop or identify system modifications that can be implemented in the average household (ex: affordable water filter)

Future Project Idea #6

Identify plastic alternatives based on vendor preferences and economic feasibility for material implementation



GOAL 8: TRACKING

This goal will allow SJC to track the school's progress throughout the program in the future in addition to identify and address weak areas as the program progresses.

Recommendations:

1. Continue monthly tracking efforts conducted throughout Goal 1
2. Complete SJC SWOT Analysis to determine strengths and weaknesses of the program within the SJC community
3. Additional parent and faculty surveys and compare to the data obtained through our research

GOAL 9: PARTNERSHIPS

Partnerships with other organizations will promote the longevity of SJC's efforts in addition to expanding outreach beyond the school community.

Recommendations:

1. Partnerships with a variety of organizations such as governmental, non-governmental, businesses, community based projects and other sustainable schools
 - a. Chulalongkorn University
 - b. Schools in St. Paul of Chartres Network
 - c. Other "To be Number One" Schools
 - d. Ministry of Education
 - e. Bangrak District Office
 - f. Bangkok Metropolitan Administration

Future Project Idea #7

Conduct secondary phase SJC SWOT Analysis and community consumption behavior surveys to determine program areas that need improvement

Future Project Idea #8

Create an integrated action plan with outside partners for spreading plastic reduction efforts throughout Bangkok

STRATEGY GUIDELINES

Strategy Guidelines, Explanations and Examples	
<p>Incentives <i>Motivate/encourage a specific behavior for personal benefit in return</i></p>	<p>Other: <u>India</u> Several shops and markets have a “cash-back” plan, a 1-2% reimbursement when using reusable bag instead of plastic bag. The program increased cloth bag users 11.2% in 8 weeks.</p> <p><u>Clean the Beach Boot Camp</u> Through Boot Camps, attendees enjoy working out and cleaning up plastic waste from the beach.</p> <p><u>Refun</u> Offers monetary discounts at specific stores for returning plastic bottles to the Refun machine in Siam and Chulalongkorn University Areas.</p>
<p>Bag Charge/Taxation <i>Adding an economic charge to a plastic item to reduce their consumption.</i></p>	<p>Other: <u>California</u> Charges 10 cents for every plastic bag a consumer uses</p>
<p>Banning <i>Completely prohibiting the use of a certain item</i></p>	<p><u>Chula Zero Waste</u> Banned plastic bags in Chulalongkorn University’s campus, reducing plastic bag consumption by 90%.</p>

	<p>Other: <u>Rwanda</u> Government completely banned manufacturing, importation use and sale of plastic packaging throughout the country.</p> <p><u>San Francisco</u> Banned single-use plastic bottles.</p>
<p>Waste Separation <i>Segregated management of waste for a proper disposal of the material</i></p>	<p><u>Roong Aroon</u> Separates resources from waste and turns waste into resources.</p> <p><u>Chula Zero Waste</u> Improves waste collecting and separating process.</p> <p>Other: <u>Taiwan</u> Reduced waste per capita for 66% and increased waste-recycling rate by 49% with The Waste Disposal Act which ensures waste separation into three categories, one being recyclables.</p>
<p>Changing Default <i>Changing the automatic response from vendors</i></p>	<p><u>Plastic Free NIST</u> Made a No Straw Day with the intent to show there is no need of using a straw.</p> <p><u>Rereef</u> Straws on request campaign, changing the default of beverages services to not give out plastic straws unless requested by the customer.</p>

<p>Education</p> <p><i>Spreading awareness about specific issue to justify actions</i></p>	<p><u>Can Do Team</u> Performed workshops about impacts of plastic in the Thungkhru district to incentivise individuals not to litter and reduce plastic consumption. Due to low participation and impact workshops had to be discontinued.</p> <p><u>Trash Hero</u> Through their activities and promotional videos they educate about plastic impacts and spread awareness of the situation around Thailand.</p> <p><u>Plastic Free NIST</u> Through NIST's sustainability program, they give talks about sustainability to elementary school and the global impacts of plastic.</p> <p>Other: <u>Combine in One Campaign</u> Teachers vendors to reduce number of plastic bags they had to consumers per bought by consumer.</p>
<p>Changing Individual Behavior</p> <p><i>Being proactive in minimizing plastic use</i></p>	<p><u>Trash Hero</u> Say no to Plastic Bags, using reusable bags instead.</p>

<p>Business Cooperation <i>Partnering with businesses to support and/or sponsor the initiative</i></p>	<p><u>Thai Plastic Recycle</u> Collaborating with businesses that have found alternatives uses for plastic bottle waste.</p> <p><u>Rereef</u> Some restaurants have adopted their campaign of Straws on request.</p>
<p>Reusable Item/Alternative Material <i>The use of alternative materials to plastic</i></p>	<p><u>Plastic Free NIST</u> Campaign to use bamboo straws, stainless steel cups and reusable water bottles instead of</p> <p><u>Rereef</u> Promotes the use of reusable straws and reusable utensils</p> <p><i>Others:</i> <u>Broccoli Revolution</u> Gives waterproof morning glory stems instead of straws and provides customers plant-based food containers and bioplastic cutlery.</p>

Pros and Cons of Strategies		
Method	Pros	Cons
Incentives	Appeals to personal benefits Encourages participation	Lack of continuity Difficult to track success
Bag Charging	Has been successful in reducing consumption Generates funding for other projects	Results in public disagreement
Waste Separation	Increases recycling Reduces plastic litter	Lack of proper system use and understanding Does not reduce consumption
Changing Default	Opportunity to deny plastic item	Message not clear to customers
Education	Spread awareness on the issue	Lack of follow through results in little impact
Changing Behavior	Long-term impact	Difficult and ineffective
Business Cooperation	Larger impact in community	Difficult to follow up with
Reusable Items/Alternatives	Alternatives to plastic Selling items can generate funding for other projects	Higher initial cost Seen as less convenient
Community Involvement	Engages more stakeholders Allows for larger changes	Lack of continuity and participation

PARTNERSHIP INFORMATION



Chula Zero Waste

Classification: School Based

Mission Statement

Change behaviors and attitudes of the university community in regards to proper waste disposal habits.

Reason

The university was concerned about public safety due to fires at open-dumping sites

Goals

Reduce the volume of residual waste for disposal by at least 30%

Strengths

Utilization of various strategies
Business cooperation
Infrastructure improvements
Integrated and comprehensive

Limitations

Ineffective advertisements
Lack of active involvement



Roong Aroon

Classification: School Based

Mission Statement

The school valued resources and integrated awareness into daily life. All members of the school community are acutely aware of their resources consumption. Guided by the Buddhist perspective, school member have managed to create a resource management system

Reason

Lots of waste in school
Disgusting scenery
Bad smell of waste

Goals

Become entirely zero waste
Commercialization

Strengths

Personal responsibility
Create sustainable standard
Set mindset

Limitations

Not enough time to clean waste before sorting
Large amount of dirty plastic



ReReef

Classification: Community Based

Mission Statement

Focusing on the individual and the system to raise awareness and change daily behaviors. Campaigning to show the negative impacts of single-use straws

Reason

Facts about plastic triggered change but main focus on straws because of study results

Goals

Gain more participation
Change defaults
Raise awareness by spreading to new areas
Could potentially start a movement

Strengths

Have research and information
International topic
Public awareness
Connected to many stakeholders

Limitations

Economic constraint



Thai Plastic Recycling

Classification: Business

Mission Statement

Use Thai plastic water bottles and recycle it into another material that can be used

Reason

Saw a lot of plastic and nothing being done with it so he turned it into a business opportunity

Goals

More investors to make the recycling business grow

Strengths

High technology
Environmental friendly

Limitations

Only recycle plastic bottles



Trash Hero Bangkok
Classification: Community Based

Mission Statement
 “We clean, we educate, we change”

Reason

There is a large amount of trash build up on beaches.

Goals

Hands on experience while educating
 Sustainable Community Builder projects
 Motivate people to become Trash Heroes
 Inspire long-term behavior change

Strengths

Volunteer based
 National recognition
 Help communities
 Simple and straightforward

Limitations

Lack of active involvement
 Weak disposal methods
 Cultural differences

Can Do Team

Can Do Team

Classification: Community Based

Mission Statement

Community development and sustainability

Reason

Community development
Volunteers

Goals

Gain long term attention
Community continuing their initiative

Strengths

Contacts
Resources
Trust within the community

Limitations

No help from government
Solidifying an ideas and methods
Difficult to change people's habits
Working with local sponsors

Partnership Guidelines

We highly recommend collaborating with organizations interested in reducing plastic use. From our research, we recommend partnering with:

1. Trash Hero Thailand

- a. Their community-based programs are great community builders while spreading awareness of plastic impacts. Their projects are also interactive which engages the individuals in their activities. In addition, their years' experience could assist SJC accomplish goals in their action plan.

2. Thai Plastic Recycle

- . As a plastic recycling business, partnering with them to take care of the water bottles or plastic cups discarded at the school will guarantee proper disposal of the plastic.

3. Ministry of Education

- . The ministry of education has funded programs like Chula Zero Waste. SJAA could potentially receive funding from this department and improve the current systems used by SJC.

4. Plastic Free NIST

- . As a student-led service group, Plastic Free NIST's passion for sustainability has greatly affected their institution. In addition, they are interested in expanding their projects and building connections/partnerships with other schools in Bangkok.

5. Roong Aroon School

- . Their Zero Waste program could be a good example to follow for the reducing and reusing waste in the community. Roong Aroon is also a well-known Thai school in Bangkok; a partnership would make a powerful team and would stand out as a leader example in the community.

Other connections within the SJAA community or the SJC's parents are highly recommended, as it will guarantee community participation, support, and program success.

MARKETING STRATEGIES

Program Summary of Marketing Strategies

Chula Zero Waste <i>Classification:</i> School Based <i>Overview:</i>	<ul style="list-style-type: none"> • Media Outreach • Education Curriculum • Signs and poster throughout campus
Roong Aroon <i>Classification:</i> School Based	<ul style="list-style-type: none"> • Community based initiatives • Students involvement programs • Persuade to do good things together
ReReef <i>Classification:</i> Community Based	<ul style="list-style-type: none"> • Social media (Facebook) • Educational materials <ul style="list-style-type: none"> ○ Posters ○ Fact sheets • Research findings
Thai Plastic Recycling <i>Classification:</i> Business	<ul style="list-style-type: none"> • Webpage • Media Outreach

Trash Hero Bangkok <i>Classification: Community Based</i>	<ul style="list-style-type: none"> • Slogan “We clean, we educate, we change” • Facebook page and website • Through actual program activity
Plastic Free NIST <i>Classification: School Based</i>	<ul style="list-style-type: none"> • Printing posters and advertising at school • Sold stainless steel cups and bamboo straws • Gave public speech of their mission • Utilized the school’s TV and twitter account to advertise
Can Do Team <i>Classification: Community Based</i>	<ul style="list-style-type: none"> • Social media (Facebook) • Community Festivals (Bangmod Fest)

SWOT ANALYSIS

The SWOT analysis is a strategy used to analyze the Strengths, Weaknesses, Opportunities and Threats of an organization/program. We recommend using this strategy to evaluate the progress of the program(s) each year in order to improve.